Package ‘PFIM’

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Type Package

Title Population Fisher Information Matrix

Version 6.0.3

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Description Evaluate or optimize designs for nonlinear mixed effects models using the Fisher Information matrix. Methods used in the package refer to
Mentré F, Mallet A, Baccar D (1997) <doi:10.1093/biomet/84.2.429>,
Retout S, Comets E, Samson A, Mentré F (2007) <doi:10.1002/sim.2910>,
Bazzoli C, Retout S, Mentré F (2009) <doi:10.1002/sim.3573>,
Le Nagard H, Chao L, Tenaillon O (2011) <doi:10.1186/1471-2148-11-326>,
Combes FP, Retout S, Frey N, Mentré F (2013) <doi:10.1007/s11095-013-1079-3> and
Seurat J, Tang Y, Mentré F, Nguyen TT (2021) <doi:10.1016/j.cmpb.2021.106126>.

URL `http://www.pfim.biostat.fr/`

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Collate 'GenericMethods.R' 'Administration.R'
'AdministrationConstraints.R' 'Arm.R' 'Fim.R' 'BayesianFim.R'
'ModelError.R' 'Combined1.R' 'Constant.R' 'Design.R'
'Distribution.R' 'ModelParameter.R' 'LibraryOfPDModels.R'
'LibraryOfPKModels.R' 'LibraryOfModels.R'
'LibraryOfPKPDModels.R' 'Model.R' 'PFIMProject.R'
'Evaluation.R' 'OptimizationAlgorithm.R'
'FedorovWynnAlgorithm.R' 'IndividualFim.R' 'LogNormal.R'
'ModelODE.R' 'ModelAnalytic.R' 'ModelAnalyticBolus.R'
'ModelAnalyticSteadyState.R' 'ModelAnalyticBolusSteadyState.R'
'ModelInfusion.R' 'ModelAnalyticInfusion.R'

'ModelAnalyticInfusionSteadyState.R' 'ModelBolus.R' 'ModelODEBolus.R' 'ModelODEDoseInEquations.R' 'ModelODEDoseNotInEquations.R' 'ModelODEInfusion.R' 'ModelODEInfusionDoseInEquations.R' 'MultiplicativeAlgorithm.R' 'Normal.R' 'Optimization.R' 'PFIM-package.R' 'PGBOAlgorithm.R' 'PSOAlgorithm.R' 'PlotEvaluation.R' 'PopulationFim.R' 'Proportional.R' 'SamplingTimeConstraints.R' 'SamplingTimes.R' 'SimplexAlgorithm.R'

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R topics documented:

`PFIM-package` *Fisher Information matrix for design evaluation/optimization for non-linear mixed effects models.*

Description

Evaluate or optimize designs for nonlinear mixed effects models using the Fisher Information matrix. Methods used in the package refer to Mentré F, Mallet A, Baccar D (1997) doi:10.1093/biomet/84.2.429, Retout S, Comets E, Samson A, Mentré F (2007) doi:10.1002/sim.2910, Bazzoli C, Retout S, Mentré F (2009) doi:10.1002/sim.3573, Le Nagard H, Chao L, Tenaillon O (2011) doi:10.1186/1471214811326, Combes FP, Retout S, Frey N, Mentré F (2013) doi:10.1007/s11095-01310793 and Seurat J, Tang Y, Mentré F, Nguyen TT (2021) doi:10.1016/j.cmpb.2021.106126.

Description

Nonlinear mixed effects models (NLMEM) are widely used in model-based drug development and use to analyze longitudinal data. The use of the "population" Fisher Information Matrix (FIM) is a good alternative to clinical trial simulation to optimize the design of these studies. PFIM 6.0 was released in 2023. The present version, **PFIM** 6.0, is an R package that uses the S4 object system for evaluating and/or optimizing population designs based on FIM in NLMEMs.

This version of **PFIM** now includes a library of models implemented also using the object oriented system S4 of R. This library contains two libraries of pharmacokinetic (PK) and/or pharmacodynamic (PD) models. The PK library includes model with different administration routes (bolus, infusion, first-order absorption), different number of compartments (from 1 to 3), and different types of eliminations (linear or Michaelis-Menten). The PD model library, contains direct immediate models (e.g. Emax and Imax) with various baseline models, and turnover response models. The PK/PD models are obtained with combination of the models from the PK and PD model libraries. **PFIM** handles both analytical and ODE models and offers the possibility to the user to define his/her own model(s). In **PFIM 6.0**, the FIM is evaluated by first order linearization of the model assuming a block diagonal FIM as in [3]. The Bayesian FIM is also available to give shrinkage predictions [4]. **PFIM 6.0** includes several algorithms to conduct design optimization based on the D-criterion, given design constraints : the simplex algorithm (Nelder-Mead) [5], the multiplicative algorithm [6], the Fedorov-Wynn algorithm [7], PSO (*Particle Swarm Optimization*) and PGBO (*Population Genetics Based Optimizer*) [9].

Documentation

Documentation and user guide are available at `http://www.pfim.biostat.fr/`

Validation

PFIM 6.0 also provides quality control with tests and validation using the evaluated FIM to assess the validity of the new version and its new features. Finally, **PFIM 6.0** displays all the results with both clear graphical form and a data summary, while ensuring their easy manipulation in R. The standard data visualization package ggplot2 for R is used to display all the results with clear graphical form [10]. A quality control using the D-criterion is also provided.

Organization of the source files in the `/R` folder

PFIM 6.0 contains a hierarchy of S4 classes with corresponding methods and functions serving as constructors. All of the source code related to the specification of a certain class is contained in a file named `[Name_of_the_class]-Class.R`. These classes include:

- 1. all roxygen `@include` to insure the correctly generated collate for the DESCRIPTION file,
- 2. `\setClass` preceded by a roxygen documentation that describes the purpose and slots of the class,
- 3. specification of an initialize method,
- 4. all getter and setter, respectively returning attributes of the object and associated objects.

Content of the source code and files in the `/R` folder

Class `Administration`

- `getOutcome`
- `setOutcome`
- `getTimeDose`
- `setTimeDose`
- `getDose`
- `setDose`
- `getTinf`
- `setTinf`
- `getTau`
- `setTau`

Class `AdministrationConstraints`

- `getOutcome`
- `getDose`

Class `Arm`

- `getName`
- `setName`
- `getSize`
- `setSize`
- `getAdministrations`
- `setAdministrations`
- `getSamplingTimes`
- `setSamplingTimes`
- `getInitialConditions`
- `setInitialConditions`
- `getAdministrationsConstraints`
- `getSamplingTimesConstraints`
- `getSamplingTime`
- `getSamplingTimeConstraint`
- `setSamplingTimesConstraints`
- `setSamplingTime`
- `getAdministration`
- `getAdministrationConstraint`
- `EvaluateArm`

Class BayesianFim

- EvaluateFisherMatrix
- getRSE
- getConditionNumberVarianceEffects
- getShrinkage
- setShrinkage
- reportTablesFIM
- generateReportEvaluation

Class Combined1

- See class ModelError

Class Constant

- See class ModelError

Class Design

- getName
- setName
- getSize
- setSize
- setArms
- getOutcomesEvaluation
- setOutcomesEvaluation
- getOutcomesGradient
- setOutcomesGradient
- getFim
- setFim
- getNumberOfArms
- setNumberOfArms
- setArm
- EvaluateDesign
- plotOutcomesEvaluation
- plotOutcomesGradient
- reportTablesAdministration
- reportTablesDesign

Class Distribution

- getParameters

- `setParameters`
- `getMu`
- `setMu`
- `getOmega`
- `setOmega`
- `getAdjustedGradient`

Class `Evaluation`

- `run`
- `reportTablesPlot`
- `generateTables`
- `Report`

Class `FedorovWynnAlgorithm`

- `FedorovWynnAlgorithm_Rcpp`
- `resizeFisherMatrix`
- `setParameters`
- `optimize`
- `generateReportOptimization`

Class `FedorovWynnAlgorithm`

- `FedorovWynnAlgorithm_Rcpp`
- `resizeFisherMatrix`
- `setParameters`
- `optimize`
- `generateReportOptimization`

Class `Fim`

- `EvaluateFisherMatrix`
- `EvaluateVarianceFIM`
- `getFisherMatrix`
- `setFisherMatrix`
- `getFixedEffects`
- `setFixedEffects`
- `getVarianceEffects`
- `setVarianceEffects`
- `getDeterminant`
- `getDcriterion`

- getCorrelationMatrix
- getSE
- getRSE
- getShrinkage
- getEigenValues
- getConditionNumberFixedEffects
- getConditionNumberVarianceEffects
- getColumnAndParametersNamesFIM
- getColumnAndParametersNamesFIMInLatex
- reportTablesFIM
- generateReportEvaluation
- setFimTypeToString

Class GenericMethods

- getName
- getNames
- getSize
- setSize
- getOutcome
- setOutcome
- getFim
- getOdeSolverParameters
- getMu
- setMu
- getOmega
- setOmega
- getParameters
- setParameters
- getModelError
- getSamplings
- getFim
- setName
- setArms
- getArms

Class IndividualFim

- EvaluateFisherMatrix
- EvaluateVarianceFIM

- getRSE
- getShrinkage
- setShrinkage
- reportTablesFIM
- generateReportEvaluation

Class LibraryOfModels

- getName
- getContent
- setContent
- addModel
- addModels
- getLibraryPKModels
- getLibraryPDModels

Class LibraryOfPKPDModels

- getPKModel
- getPDModel
- getPKPDModel

Class LogNormal

- getAdjustedGradient

Class Model

- getName
- setName
- getDescription
- setDescription
- getEquations
- setEquations
- setModelFromLibrary
- getOutcomes
- setOutcomes
- getOutcomesForEvaluation
- setOutcomesForEvaluation
- getParameters
- setParameters
- getModelError

- setModelError
- getInitialConditions
- setInitialConditions
- getOdeSolverParameters
- setOdeSolverParameters
- getModelFromLibrary
- convertPKModelAnalyticToPKModelODE
- getNumberOfParameters
- isModelODE
- isModelAnalytic
- isDoseInEquations
- isModelInfusion
- isModelSteadyState
- isModelBolus
- definePKPDModel
- definePKModel
- defineModel
- defineModelFromLibraryOfModels
- defineModelUserDefined
- defineModelType
- EvaluateModel
- parametersForComputingGradient
- EvaluateVarianceModel
- getFixedParameters
- getModelErrorParametersValues
- reportTablesModelParameters
- reportTablesModelError

Class ModelAnalytic

- EvaluateModel
- definePKModel
- definePKPDModel
- convertPKModelAnalyticToPKModelODE

Class ModelAnalyticBolus

- See class ModelAnalytic

Class ModelAnalyticBolusSteadyState

- See class `ModelAnalyticBolus`

Class `ModelBolus`

- See class `Model`

Class `ModelError`

- `getOutcome`
- `getEquation`
- `setEquation`
- `getDerivatives`
- `setDerivatives`
- `getSigmaInter`
- `setSigmaInter`
- `getSigmaSlope`
- `setSigmaSlope`
- `getcError`
- `setcError`
- `getParameters`
- `EvaluateErrorModelDerivatives`

Class `ModelInfusion`

- `getEquationsDuringInfusion`
- `getEquationsAfterInfusion`
- `setEquationsAfterInfusion`
- `setEquationsDuringInfusion`

Class `ModelODE`

- See class `Model`

Class `ModelODEBolus`

- `EvaluateModel`
- `definePKPDModel`

Class `ModelODEDoseInEquations`

- `EvaluateModel`
- `definePKModel`
- `definePKPDModel`

Class `ModelODEDoseNotInEquations`

- EvaluateModel
- definePKModel
- definePKPDModel

Class ModelODEInfusion

- See class ModelInfusion

Class ModelODEInfusionDoseInEquations

- EvaluateModel
- definePKModel
- definePKPDModel

Class ModelParameter

- getName
- getDistribution
- setDistribution
- getFixedMu
- setFixedMu
- getFixedOmega
- setFixedOmega
- getMu
- setMu
- getOmega
- setOmega

Class MultiplicativeAlgorithm

- MultiplicativeAlgorithm_Rcpp
- getLambda
- getDelta
- getNumberOfIterations
- getOptimalWeights
- setOptimalWeights
- setParameters
- optimize
- getDataFrameResults
- plotWeights
- generateReportOptimization

Class Normal

- getAdjustedGradient

Class Optimization

- getProportionsOfSubjects
- getOptimizationResults
- setOptimizationResults
- getEvaluationFIMResults
- setEvaluationFIMResults
- setEvaluationInitialDesignResults
- getEvaluationInitialDesignResults
- getElementaryProtocols
- generateFimsFromConstraints
- run
- plotWeights
- Report

Class PFIMProject

- getName
- setModel
- getModel
- getModelEquations
- getModelParameters
- getModelError
- getDesigns
- getFim
- getOdeSolverParameters
- getOutcomes
- getOptimizer
- getOptimizerParameters
- run
- generateTables
- Report

Class PGBOAlgorithm

- setParameters
- optimize
- generateReportOptimization

Class PlotEvaluation

- plot
- plotSE
- plotRSE
- plotShrinkage

Class PopulationFim

- EvaluateFisherMatrix
- EvaluateVarianceFIM
- getRSE
- getShrinkage
- setShrinkage
- reportTablesFIM
- generateReportEvaluation

Class Proportional

- See class ModelError

Class PSOAlgorithm

- setParameters
- optimize
- generateReportOptimization

Class SamplingTimeConstraints

- getOutcome
- getSamplings
- getFixedTimes
- getNumberOfTimesByWindows
- getMinSampling
- getSamplingsWindows
- getNumberOfsamplingsOptimisable
- checkSamplingTimeConstraintsForContinuousOptimization
- generateSamplingsFromSamplingConstraints

Class SamplingTimes

- getOutcome
- setOutcome
- getSamplings
- setSamplings

Class `SimplexAlgorithm`

- `setParameters`
- `fun.amoeba`
- `fisher.simplex`
- `optimize`
- `generateReportOptimization`

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References

[1] Dumont C, Lestini G, Le Nagard H, Mentré F, Comets E, Nguyen TT, et al. PFIM 4.0, an extended R program for design evaluation and optimization in nonlinear mixed-effect models. Comput Methods Programs Biomed. 2018;156:217-29.

[2] Chambers JM. Object-Oriented Programming, Functional Programming and R. Stat Sci. 2014;29:167-80.

[3] Mentré F, Mallet A, Baccar D. Optimal Design in Random-Effects Regression Models. Biometrika. 1997;84:429-42.

[4] Combes FP, Retout S, Frey N, Mentré F. Prediction of shrinkage of individual parameters using the Bayesian information matrix in nonlinear mixed effect models with evaluation in pharmacokinetics. Pharm Res. 2013;30:2355-67.

[5] Nelder JA, Mead R. A simplex method for function minimization. Comput J. 1965;7:308-13.

[6] Seurat J, Tang Y, Mentré F, Nguyen, TT. Finding optimal design in nonlinear mixed effect models using multiplicative algorithms. Computer Methods and Programs in Biomedicine, 2021.

[7] Fedorov VV. Theory of Optimal Experiments. Academic Press, New York, 1972.

[8] Eberhart RC, Kennedy J. A new optimizer using particle swarm theory. Proc. of the Sixth International Symposium on Micro Machine and Human Science, Nagoya, 4-6 October 1995, 39-43.

[9] Le Nagard H, Chao L, Tenaillon O. The emergence of complexity and restricted pleiotropy in adapting networks. BMC Evol Biol. 2011;11:326.

[10] Wickham H. ggplot2: Elegant Graphics for Data Analysis, Springer-Verlag New York, 2016.

See Also

Useful links:

- http://www.pfim.biostat.fr/

addModel — *Add a model to a library of models.*

Description

Add a model to a library of models.

Usage

```
addModel(object, model)

## S4 method for signature 'LibraryOfModels'
addModel(object, model)
```

Arguments

`object`	An object from the class LibraryOfModels.
`model`	An object from the class Model.

Value

The library of models with the added model.

addModels — *Add a models to a library of models.*

Description

Add a models to a library of models.

Usage

```
addModels(object, models)

## S4 method for signature 'LibraryOfModels'
addModels(object, models)
```

Arguments

`object`	An object from the class LibraryOfModels.
`models`	A list of object from the class Model.

Value

The library of models with the added models.

`Administration-class` *Class "Administration"*

Description

The class `Administration` defines information concerning the parametrization and the type of administration: single dose, multiple doses. Constraints can also be added on the allowed times, doses and infusion duration.

Objects from the class

Objects form the class `Administration` can be created by calls of the form `Administration(...)` where (...) are the parameters for the `Administration` objects.

Slots for `Administration` objects

`outcome`: A character string giving the name for the response of the model.

`timeDose`: A numeric vector giving the times when doses are given.

`dose`: A numeric vector giving the amount of doses.

`Tinf`: A numeric vector giving the infusion duration Tinf (Tinf can be null).

`tau`: A numeric giving the frequency.

`AdministrationConstraints-class`
Class "AdministrationConstraints"

Description

The class `AdministrationConstraints` represents the constraint of an input to the system. The class stores information concerning the constraints for the dosage regimen: response of the model, amount of dose.

Objects from the class

Objects form the class `AdministrationConstraints` can be created by calls of the form `AdministrationConstraints(...`
where (...) are the parameters for the `AdministrationConstraints` objects.

Slots for `AdministrationConstraints` objects

`outcome`: A character string giving the name for the response of the model.

`doses`: A numeric vector giving the amount of doses.

`Arm-class` *Class "Arm"*

Description

The class `Arm` combines the treatment and the sampling schedule.

Objects from the class

Objects form the class `Arm` can be created by calls of the form `Arm(...)` where (...) are the parameters for the `Arm` objects.

Slots for the `Arm` objects

`name`: A string giving the name of the arm.

`size`: An integer giving the number of subjects in the arm. By default set to 1.

`administrations`: A list of the administrations.

`initialConditions`: A list of the initial conditions.

`samplingTimes`: A list of the sampling times.

`administrationsConstraints`: A list of the administrations constraints.

`samplingTimesConstraints`: A list of the sampling times constraints.

`BayesianFim-class` *Class "BayesianFim"*

Description

The class `BayesianFim` represents the population Fisher information matrix. The class `BayesianFim` inherits from the class `Fim`.

`checkSamplingTimeConstraintsForContinuousOptimization` *Check for the samplingTime constraints for continuous optimization*

Description

Check for the samplingTime constraints for continuous optimization

Usage

```
checkSamplingTimeConstraintsForContinuousOptimization(
  object,
  arm,
  newSamplings,
  outcome
)

## S4 method for signature 'SamplingTimeConstraints'
checkSamplingTimeConstraintsForContinuousOptimization(
  object,
  arm,
  newSamplings,
  outcome
)
```

Arguments

`object`	An object from the class SamplingTimeConstraints.
`arm`	An object from the class Arm.
`newSamplings`	A vector giving the new sampling.
`outcome`	The outcomes for the model.

Value

A list of Boolean giving true if the minimal sampling times is in the vector of sampling times & the number of sampling for each windows is respected false otherwise.

`checkValiditySamplingConstraint` *checkValiditySamplingConstraint*

Description

Check the validity of he sampling times constraints

Usage

```
checkValiditySamplingConstraint(object)

## S4 method for signature 'Design'
checkValiditySamplingConstraint(object)
```

Arguments

`object`	An object from the class Design.

Value

An error message if a constraint is not valid.

`Combined1-class` *Class "Combined1"*

Description

The class `Combined1` defines the the residual error variance according to the formula g(sigmaInter, sigmaSlope, cError, f(x, theta)) = sigmaInter + sigmaSlope*f(x,theta)). The class `Combined1` inherits from the class `ModelError`.

Objects from the class

Combined1 objects are typically created by calls to `Combined1` and contain the following slots that are inherited from the class ModelError:

`outcome`**:** A string giving the name of the outcome.

`equation`**:** An symbolic expression of the model error.

`derivatives`**:** A list containing the derivatives of the model error expression.

`sigmaInter`**:** A numeric value giving the sigma inter of the error model.

`sigmaSlope`**:** A numeric value giving the sigma slope of the error model.

`cError`**:** A numeric value giving the exponant c of the error model.

`Constant-class` *Class "Constant"*

Description

The class `Constant` defines the the residual error variance according to the formula g(sigma_inter, sigma_slope, c_error, f(x, theta)) = sigma_inter. The class `Constant` inherits from the class `ModelError`.

Objects from the class

`Constant` objects are typically created by calls to `Constant` and contain the following slots that are inherited from the class ModelError:

`outcome`**:** A string giving the name of the outcome.

`equation`**:** An symbolic expression of the model error.

`derivatives`**:** A list containing the derivatives of the model error expression.

`sigmaInter`**:** A numeric value giving the sigma inter of the error model.

`sigmaSlope`**:** A numeric value giving the sigma slope of the error model.

`cError`**:** A numeric value giving the exponant c of the error model.

`convertPKModelAnalyticToPKModelODE` *Convert an analytic model to a ode model.*

Description

Convert an analytic model to a ode model.

Usage

```
convertPKModelAnalyticToPKModelODE(object)

## S4 method for signature 'ModelAnalytic'
convertPKModelAnalyticToPKModelODE(object)

## S4 method for signature 'ModelAnalyticSteadyState'
convertPKModelAnalyticToPKModelODE(object)

## S4 method for signature 'ModelAnalyticInfusion'
convertPKModelAnalyticToPKModelODE(object)
```

Arguments

`object`	An object from the class Model.

Value

A ode model.

`defineModel` *Define a model.*

Description

Define a model.

Usage

```
defineModel(object, designs)

## S4 method for signature 'Model'
defineModel(object, designs)
```

Arguments

`object`	An object from the class Model.
`designs`	A list of objects from the class Design.

Value

A model defined either from the library of models or user defined.

---

defineModelFromLibraryOfModels

Define a model from the library of models.

Description

Define a model from the library of models.

Usage

```
defineModelFromLibraryOfModels(object, designs)

## S4 method for signature 'Model'
defineModelFromLibraryOfModels(object, designs)
```

Arguments

`object`	An object from the class Model.
`designs`	A list of objects from the class Design.

Value

A model defined from the library of models.

---

defineModelType

Define the type of a model.

Description

Define the type of a model.

Usage

```
defineModelType(object, designs)

## S4 method for signature 'Model'
defineModelType(object, designs)
```

Arguments

`object`	An object from the class Model.
`designs`	A list of objects from the class Design.

Value

Return a model defined as analytic, ode, etc.

---

defineModelUserDefined — *Define a user defined model.*

Description

Define a user defined model.

Usage

```
defineModelUserDefined(object, designs)

## S4 method for signature 'Model'
defineModelUserDefined(object, designs)
```

Arguments

`object`	An object from the class Model.
`designs`	A list of objects from the class Design.

Value

A model giving a user defined model.

---

definePKModel — *Define a PK model.*

Description

Define a PK model.

Usage

```
definePKModel(object, outcomes)

## S4 method for signature 'ModelAnalytic'
definePKModel(object, outcomes)

## S4 method for signature 'ModelAnalyticSteadyState'
definePKModel(object, outcomes)

## S4 method for signature 'ModelAnalyticInfusion'
```

```
definePKModel(object, outcomes)

## S4 method for signature 'ModelODEDoseInEquations'
definePKModel(object, outcomes)

## S4 method for signature 'ModelODE'
definePKModel(object, outcomes)

## S4 method for signature 'ModelODEInfusionDoseInEquations'
definePKModel(object, outcomes)
```

Arguments

`object`	An object from the class Model.
`outcomes`	A list giving the outcomes of the PK model.

Value

A model giving a PK model.

`definePKPDModel` *Define a PKPD model.*

Description

Define a PKPD model.

Usage

```
definePKPDModel(PKModel, PDModel, outcomes)

## S4 method for signature 'ModelAnalytic,ModelAnalytic'
definePKPDModel(PKModel, PDModel, outcomes)

## S4 method for signature 'ModelAnalytic,ModelODE'
definePKPDModel(PKModel, PDModel, outcomes)

## S4 method for signature 'ModelAnalyticSteadyState,ModelAnalyticSteadyState'
definePKPDModel(PKModel, PDModel, outcomes)

## S4 method for signature 'ModelAnalyticSteadyState,ModelODE'
definePKPDModel(PKModel, PDModel, outcomes)

## S4 method for signature 'ModelAnalyticInfusion,ModelAnalytic'
definePKPDModel(PKModel, PDModel, outcomes)

## S4 method for signature 'ModelAnalyticInfusion,ModelODE'
```

```
definePKPDModel(PKModel, PDModel, outcomes)

## S4 method for signature 'ModelODEBolus,ModelODE'
definePKPDModel(PKModel, PDModel, outcomes)

## S4 method for signature 'ModelODEDoseInEquations,ModelODE'
definePKPDModel(PKModel, PDModel, outcomes)

## S4 method for signature 'ModelODEDoseNotInEquations,ModelODE'
definePKPDModel(PKModel, PDModel, outcomes)

## S4 method for signature 'ModelODEInfusion,ModelODE'
definePKPDModel(PKModel, PDModel, outcomes)

## S4 method for signature 'ModelODEInfusionDoseInEquations,ModelODE'
definePKPDModel(PKModel, PDModel, outcomes)
```

Arguments

`PKModel`	An object from the class Model.
`PDModel`	An object from the class Model.
`outcomes`	A list giving the outcomes of the PKPD model.

Value

A model giving a PKPD model.

`Design-class` *Class "Design"*

Description

The class `Design` defines information concerning the parametrization of the designs.

Objects from the class

Objects form the class `Design` can be created by calls of the form `Design(...)` where (...) are the parameters for the `Design` objects.

Slots for the `Design` objects

`name`: A string giving the name of the design.

`size`: An integer giving the number of subjects in the design.

`arms`: A list of the arms.

`outcomesEvaluation`: A list of the results of the design evaluation for the outcomes.

`outcomesGradient`: A list of the results of the design evaluation for the sensitivity indices.

`numberOfArms`**:** A numeric giving the number of arms in the design.

`fim`**:** An object of the class `Fim` containing the Fisher Information Matrix of the design.

`Distribution-class` *Class "Distribution"*

Description

The class defines all the required methods for a distribution object.

Objects from the class

Objects form the class `Distribution` can be created by calls of the form `Distribution(...)` where (...) are the parameters for the `Distribution` objects.

Slots for `Distribution` objects

`parameters`**:** A list containing the distribution parameters.

`EvaluateArm` *EvaluateArm*

Description

Evaluate an arm.

Usage

```
EvaluateArm(object, model, fim)

## S4 method for signature 'Arm'
EvaluateArm(object, model, fim)
```

Arguments

`object`	An object `arm` from the class Arm.
`model`	An object `model` from the class Model.
`fim`	An object `fim` from the class Fim.

Value

The object `fim` containing the Fisher Information Matrix the two lists `evaluationOutcomes`, `outcomesGradient` containing the results of the evaluation of the outcome and the sensitivity indices.

`EvaluateDesign` *EvaluateDesign*

Description

Evaluate an design

Usage

```
EvaluateDesign(object, model, fim)

## S4 method for signature 'Design'
EvaluateDesign(object, model, fim)
```

Arguments

`object`	An object `Design` from the class Design.
`model`	An object `model` from the class Model.
`fim`	An object `fim` from the class Fim.

Value

The object `Design` with its slot `fim`, `evaluationOutcomes`, `outcomesGradient` updated.

`EvaluateErrorModelDerivatives` *Evaluate the error model derivatives.*

Description

Evaluate the error model derivatives.

Usage

```
EvaluateErrorModelDerivatives(object, evaluationOutcome)

## S4 method for signature 'ModelError'
EvaluateErrorModelDerivatives(object, evaluationOutcome)
```

Arguments

`object`	An object from the class ModelError.
`evaluationOutcome`	A list giving the results of the model evaluation.

Value

A list giving the error variance and the Sigma derivatives.

`EvaluateFisherMatrix` *Evaluate the Fisher matrix (population, individual and Bayesian)*

Description

Evaluate the Fisher matrix (population, individual and Bayesian)

Usage

```
EvaluateFisherMatrix(object, model, arm, modelEvaluation, modelVariance)

## S4 method for signature 'BayesianFim'
EvaluateFisherMatrix(object, model, arm, modelEvaluation, modelVariance)

## S4 method for signature 'IndividualFim'
EvaluateFisherMatrix(object, model, arm, modelEvaluation, modelVariance)

## S4 method for signature 'PopulationFim'
EvaluateFisherMatrix(object, model, arm, modelEvaluation, modelVariance)
```

Arguments

`object`	An object from the class Fim.
`model`	An object from the class Model.
`arm`	An object from the class Arm.
`modelEvaluation`	A list containing the evaluation results.
`modelVariance`	A list containing the model variance.

Value

An object from the class Fim containing the Fisher matrix.

`EvaluateModel` *Evaluate a model.*

Description

Evaluate a model.

Usage

```
EvaluateModel(object, arm)

## S4 method for signature 'ModelAnalytic'
EvaluateModel(object, arm)

## S4 method for signature 'ModelAnalyticSteadyState'
EvaluateModel(object, arm)

## S4 method for signature 'ModelAnalyticInfusion'
EvaluateModel(object, arm)

## S4 method for signature 'ModelAnalyticInfusionSteadyState'
EvaluateModel(object, arm)

## S4 method for signature 'ModelODEBolus'
EvaluateModel(object, arm)

## S4 method for signature 'ModelODEDoseInEquations'
EvaluateModel(object, arm)

## S4 method for signature 'ModelODEDoseNotInEquations'
EvaluateModel(object, arm)

## S4 method for signature 'ModelODEInfusionDoseInEquations'
EvaluateModel(object, arm)
```

Arguments

`object`	An object from the class Model.
`arm`	An object from the class Arm.

Value

A list giving the results of the model evaluation.

EvaluateVarianceFIM *Evaluate the variance of the Fisher information matrix.*

Description

Evaluate the variance of the Fisher information matrix.

Usage

```
EvaluateVarianceFIM(object, model, arm, modelEvaluation, modelVariance)

## S4 method for signature 'IndividualFim'
EvaluateVarianceFIM(object, model, arm, modelEvaluation, modelVariance)

## S4 method for signature 'PopulationFim'
EvaluateVarianceFIM(object, model, arm, modelEvaluation, modelVariance)
```

Arguments

`object`	An object from the class Fim.
`model`	An object from the class Model.
`arm`	An object from the class Arm.
`modelEvaluation`	A list containing the evaluation results.
`modelVariance`	A list containing the model variance.

Value

A list containing the matrices of the variance of the FIM.

EvaluateVarianceModel *Evaluate the variance of a model.*

Description

Evaluate the variance of a model.

Usage

```
EvaluateVarianceModel(object, arm, evaluationModel)

## S4 method for signature 'Model'
EvaluateVarianceModel(object, arm, evaluationModel)
```

Arguments

`object`	An object from the class Model.
`arm`	An object from the class Arm.
`evaluationModel`	A list giving the outputs of the model evaluation.

Value

Return a list giving the results of the evaluation of the model variance.

`Evaluation-class` *Class "Evaluation"*

Description

A class storing information concerning the evaluation of a design.

Objects from the class

Objects form the class `Evaluation` can be created by calls of the form `Evaluation(...)` where (...) are the parameters for the `Evaluation` objects.

Slots for the `Evaluation` objects

`name`**:** A string giving the name of the project.

`model`**:** A object of class Model giving the model.

`modelEquations`**:** A list giving the model equations.

`modelParameters`**:** A list giving the model parameters.

`modelError`**:** A list giving the model error for each outcome of the model.

`outcomes`**:** A list giving the model outcomes.

`designs`**:** A list giving the designs to be evaluated.

`fim`**:** An object of the class `Fim` containing the Fisher Information Matrix of the design.

`odeSolverParameters`**:**

`FedorovWynnAlgorithm-class`
Class "FedorovWynnAlgorithm"

Description

Class `FedorovWynnAlgorithm` represents an initial variable for ODE model.

Objects from the class `FedorovWynnAlgorithm`

Objects form the class `FedorovWynnAlgorithm` can be created by calls of the form `FedorovWynnAlgorithm(...)` where (...) are the parameters for the `FedorovWynnAlgorithm` objects.

Slots for `FedorovWynnAlgorithm` objects

`elementaryProtocols`**:** A list of vector for the initial elementary protocols.

`numberOfSubjects`**:** A vector for the number of subjects.

`proportionsOfSubjects`**:** A vector for the number of subjects.

`OptimalDesign`**:** A object Design giving the optimal Design.

`showProcess`**:** A boolean to show the process or not.

`FisherMatrix`**:** A vector giving the Fisher Information

`optimalFrequencies`**:** A vector of the optimal frequencies.

`optimalSamplingTimes`**:** A list of vectors for the optimal sampling times.

`optimalDoses`**:** A vector for the optimal doses.

`FedorovWynnAlgorithm_Rcpp`
Fedorov-Wynn algorithm in Rcpp.

Description

Run the FedorovWynnAlgorithm in Rcpp

Usage

```
FedorovWynnAlgorithm_Rcpp(
  protocols_input,
  ndimen_input,
  nbprot_input,
  numprot_input,
  freq_input,
  nbdata_input,
  vectps_input,
  fisher_input,
  nok_input,
  protdep_input,
  freqdep_input
)
```

Arguments

`protocols_input`	parameter protocols_input
`ndimen_input`	parameter ndimen_input
`nbprot_input`	parameter nbprot_input
`numprot_input`	parameter numprot_input
`freq_input`	parameter freq_input
`nbdata_input`	parameter nbdata_input
`vectps_input`	parameter vectps_input
`fisher_input`	parameter fisher_input
`nok_input`	parameter nok_input
`protdep_input`	parameter protdep_input
`freqdep_input`	parameter freqdep_input

Value

A list giving the results of the outputs of the FedorovWynn algorithm.

`Fim-class` *Class "Fim"*

Description

A class storing information regarding the Fisher matrix. Type of the Fisher information: population ("PopulationFIM"), individual ("IndividualFIM") or Bayesian ("BayesianFIM").

Objects from the class

Objects form the class `Fim` can be created by calls of the form `Fim(...)` where (...) are the parameters for the `Fim` objects.

Slots for `Fim` objects

`fisherMatrix`: A matrix giving the Fisher matrix.

`fixedEffects`: A matrix giving the fixed effects of the Fisher matrix.

`varianceEffects`: A matrix giving the variance effects of the Fisher matrix.

`shrinkage`: A vector giving the shrinkage value of the parameters.

`fisher.simplex` *Compute the fisher.simplex*

Description

Compute the fisher.simplex

Usage

```
fisher.simplex(simplex, optimizationObject, outcomes)
```

Arguments

`simplex`	A list giving the parameters of the simplex.
`optimizationObject`	An object from the class Optimization.
`outcomes`	A vector giving the outcomes of the arms.

Value

A list giving the results of the optimization.

`fun.amoeba` *function fun.amoeba*

Description

function fun.amoeba

Usage

```
fun.amoeba(p, y, ftol, itmax, funk, outcomes, data, showProcess)
```

Arguments

`p`	input is a matrix p whose ndim+1 rows are ndim-dimensional vectors which are the vertices of the starting simplex.
`y`	vector whose components must be pre-initialized to the values of funk evaluated at the ndim+1 vertices (rows) of p.
`ftol`	the fractional convergence tolerance to be achieved in the function value.
`itmax`	maximal number of iterations.
`funk`	multidimensional function to be optimized.
`outcomes`	A vector giving the outcomes.
`data`	a fixed set of data.
`showProcess`	A boolean for showing the process or not.

Value

A list containing the components of the optimized simplex. 'getColumnAndParametersNames-FIMInLatex.

---

generateFimsFromConstraints

Generate the fim from the constraints

Description

Generate the fim from the constraints

Usage

```
generateFimsFromConstraints(object, fims)

## S4 method for signature 'Optimization'
generateFimsFromConstraints(object)
```

Arguments

`object`	An object from the class Optimization.
`fims`	A list of object from the class Fim.

Value

A list giving the arms with their fims.

---

generateReportEvaluation

Generate the report for the evaluation

Description

Generate the report for the evaluation

Usage

```
generateReportEvaluation(
  object,
  evaluationObject,
  outputPath,
  outputFile,
  plotOptions
)

## S4 method for signature 'BayesianFim'
generateReportEvaluation(
  object,
  evaluationObject,
  outputPath,
  outputFile,
  plotOptions
)

## S4 method for signature 'IndividualFim'
generateReportEvaluation(
  object,
  evaluationObject,
  outputPath,
  outputFile,
  plotOptions
)

## S4 method for signature 'PopulationFim'
generateReportEvaluation(
  object,
  evaluationObject,
  outputPath,
  outputFile,
  plotOptions
)
```

Arguments

`object`	An object from the class Fim.
`evaluationObject`	A list giving the results of the evaluation of the model.
`outputPath`	A string giving the output path.
`outputFile`	A string giving the name of the output file.
`plotOptions`	A list giving the plot options.

Value

Return the report for the evaluation in html.

`generateReportOptimization` *Generate report for the optimization.*

Description

Generate report for the optimization.

Usage

```
generateReportOptimization(
  object,
  optimizationObject,
  outputPath,
  outputFile,
  plotOptions
)

## S4 method for signature 'FedorovWynnAlgorithm'
generateReportOptimization(
  object,
  optimizationObject,
  outputPath,
  outputFile,
  plotOptions
)

## S4 method for signature 'MultiplicativeAlgorithm'
generateReportOptimization(
  object,
  optimizationObject,
  outputPath,
  outputFile,
  plotOptions
)

## S4 method for signature 'PGBOAlgorithm'
generateReportOptimization(
  object,
  optimizationObject,
  outputPath,
  outputFile,
  plotOptions
)

## S4 method for signature 'PSOAlgorithm'
generateReportOptimization(
  object,
  optimizationObject,
  outputPath,
  outputFile,
  plotOptions
)

## S4 method for signature 'SimplexAlgorithm'
generateReportOptimization(
  object,
  optimizationObject,
  outputPath,
  outputFile,
  plotOptions
)
```

Arguments

`object`	An object from the class OptimizationAlgorithm.
`optimizationObject`	An object from the class Optimization.
`outputPath`	A string giving the output path.
`outputFile`	A string giving the name of the output file.
`plotOptions`	A list giving the plot options.

Value

The report for the optimization in html.

---

generateSamplingsFromSamplingConstraints
Generate samplings from sampling constraints

Description

Generate samplings from sampling constraints

Usage

```
generateSamplingsFromSamplingConstraints(object)

## S4 method for signature 'SamplingTimeConstraints'
generateSamplingsFromSamplingConstraints(object)
```

Arguments

`object`	An object from the class SamplingTimeConstraints.

Value

A list of sampling times generated from the sampling constraints.

`generateTables` *Generate the tables for the report.*

Description

Generate the tables for the report.

Usage

```
generateTables(object, plotOptions)

## S4 method for signature 'Evaluation'
generateTables(object, plotOptions)

## S4 method for signature 'Optimization'
generateTables(object, plotOptions)
```

Arguments

`object`	An object from the class PFIMProject.
`plotOptions`	A list giving the plot options.

Value

A list giving the kable able for the report (evaluation and optimization).

`getAdjustedGradient` *getAdjustedGradient*

Description

Get the adjusted gradient.

Usage

```
getAdjustedGradient(object, outcomesGradient)

## S4 method for signature 'LogNormal'
getAdjustedGradient(object, outcomesGradient)

## S4 method for signature 'Normal'
getAdjustedGradient(object, outcomesGradient)
```

Arguments

`object`	An object `distribution` from the class Distribution.
`outcomesGradient`	A list containing the evaluation of the outcome gradients.

Value

A list giving the adjusted gradient.

`getAdministration` *getAdministration*

Description

Get the administrations by outcome.

Usage

```
getAdministration(object, outcome)

## S4 method for signature 'Arm'
getAdministration(object, outcome)
```

Arguments

`object`	An object `Arm` from the class Arm.
`outcome`	A string giving the name of the outcome.

Value

The element of the list `administrations` containing the administration of the outcome `outcome`

`getAdministrationConstraint` *getAdministrationConstraint*

Description

Get the administration constraints by outcome.

Usage

```
getAdministrationConstraint(object, outcome)

## S4 method for signature 'Arm'
getAdministrationConstraint(object, outcome)
```

Arguments

`object`	An object `Arm` from the class Arm.
`outcome`	A string giving the name of the outcome.

Value

The element of the list `getAdministrationConstraint` containing the administration constraints of the outcome `outcome`

`getAdministrations` *getAdministrations*

Description

Get all the administration for an arm.

Usage

```
getAdministrations(object)

## S4 method for signature 'Arm'
getAdministrations(object)
```

Arguments

`object`	An object `Arm` from the class Arm.

Value

A list `administrations` of objects from the class `Administration` class giving the parameters of the administration for the object `Arm`.

`getAdministrationsConstraints` *getAdministrationsConstraints*

Description

Get the administrations constraints.

Usage

```
getAdministrationsConstraints(object)

## S4 method for signature 'Arm'
getAdministrationsConstraints(object)
```

Arguments

`object`	An object `Arm` from the class Arm.

Value

The list `administrationsConstraints`.

`getArms` *Get the arms of an object.*

Description

Get the arms of an object.

Usage

```
getArms(object)

## S4 method for signature 'Design'
getArms(object)

## S4 method for signature 'OptimizationAlgorithm'
getArms(object)
```

Arguments

`object`	An object defined form a class of PFIM.

Value

A list containing the arms of the object.

`getcError` *Get the parameter c.*

Description

Get the parameter c.

Usage

```
getcError(object)

## S4 method for signature 'ModelError'
getcError(object)
```

Arguments

`object`	An object from the class ModelError.

Value

A numeric giving the parameter c.

`getColumnAndParametersNamesFIM` *Get the names of the names of the parameters associated to each column of the fim.*

Description

Get the names of the names of the parameters associated to each column of the fim.

Usage

```
getColumnAndParametersNamesFIM(object, model)

## S4 method for signature 'BayesianFim'
getColumnAndParametersNamesFIM(object, model)

## S4 method for signature 'IndividualFim'
getColumnAndParametersNamesFIM(object, model)

## S4 method for signature 'PopulationFim'
getColumnAndParametersNamesFIM(object, model)
```

Arguments

`object`	An object from the class Fim.
`model`	An object from the class Model.

Value

A list giving the names of the parameters associated to each column of the fim.

getColumnAndParametersNamesFIMInLatex

Get the names of the names of the parameters associated to each column of the fim in Latex format.

Description

Get the names of the names of the parameters associated to each column of the fim in Latex format.

Usage

```
getColumnAndParametersNamesFIMInLatex(object, model)

## S4 method for signature 'BayesianFim'
getColumnAndParametersNamesFIMInLatex(object, model)

## S4 method for signature 'IndividualFim'
getColumnAndParametersNamesFIMInLatex(object, model)

## S4 method for signature 'PopulationFim'
getColumnAndParametersNamesFIMInLatex(object, model)
```

Arguments

`object`	An object from the class Fim.
`model`	An object from the class Model.

Value

A list giving the names of the parameters associated to each column of the fim in Latex format.

getConditionNumberFixedEffects

Get the condition number of the matrix of the fixed effects.

Description

Get the condition number of the matrix of the fixed effects.

Usage

```
getConditionNumberFixedEffects(object)

## S4 method for signature 'Fim'
getConditionNumberFixedEffects(object)
```

Arguments

`object`	An object from the class Fim.

Value

A numeric giving the condition number of the matrix of the fixed effects.

`getConditionNumberVarianceEffects` *Get the condition number of the matrix of the variance effects.*

Description

Get the condition number of the matrix of the variance effects.

Usage

```
getConditionNumberVarianceEffects(object)

## S4 method for signature 'Fim'
getConditionNumberVarianceEffects(object)

## S4 method for signature 'BayesianFim'
getConditionNumberVarianceEffects(object)
```

Arguments

`object`	An object from the class Fim..

Value

A numeric giving the condition number of the matrix of the variance effects.

`getContent` *Get content of a library of models.*

Description

Get content of a library of models.

Usage

```
getContent(object)

## S4 method for signature 'LibraryOfModels'
getContent(object)
```

Arguments

`object`	An object from the class LibraryOfModels.

Value

A list giving the content of the library of models.

`getCorrelationMatrix` *Get the correlation matrix.*

Description

Get the correlation matrix.

Usage

```
getCorrelationMatrix(object)

## S4 method for signature 'Fim'
getCorrelationMatrix(object)

## S4 method for signature 'Evaluation'
getCorrelationMatrix(object)

## S4 method for signature 'Optimization'
getCorrelationMatrix(object)
```

Arguments

`object`	An object from the class Fim.

Value

The correlation matrix of the fim.

`getDataFrameResults` *Get the dataframe of the results.*

Description

Get the dataframe of the results.

Usage

```
getDataFrameResults(object, threshold)

## S4 method for signature 'FedorovWynnAlgorithm'
getDataFrameResults(object, threshold)

## S4 method for signature 'MultiplicativeAlgorithm'
getDataFrameResults(object, threshold)

## S4 method for signature 'Optimization'
getDataFrameResults(object, threshold)
```

Arguments

`object`	An object from the class OptimizationAlgorithm.
`threshold`	The threshold for the optimal weights / frequencies for the multiplicative and FW algorithms.

Value

Return the dataframe of the results.

`getDcriterion` *Get the D criterion of the fim.*

Description

Get the D criterion of the fim.

Usage

```
getDcriterion(object)

## S4 method for signature 'Fim'
getDcriterion(object)

## S4 method for signature 'Evaluation'
getDcriterion(object)

## S4 method for signature 'Optimization'
getDcriterion(object)
```

Arguments

`object`	An object from the class Fim.

Value

A numeric giving the D criterion of the fim.

`getDelta` *Get the parameter delta*

Description

Get the parameter delta

Usage

```
getDelta(object)

## S4 method for signature 'MultiplicativeAlgorithm'
getDelta(object)
```

Arguments

`object`	An object from the class MultiplicativeAlgorithm.

Value

A numeric giving the parameter delta.

`getDerivatives` *Get the derivatives of the model error equation.*

Description

Get the derivatives of the model error equation.

Usage

```
getDerivatives(object)

## S4 method for signature 'ModelError'
getDerivatives(object)
```

Arguments

`object`	An object from the class ModelError.

Value

The derivatives of the model error equation.

getDescription *Get the description of a model.*

Description

Get the description of a model.

Usage

```
getDescription(object)

## S4 method for signature 'Model'
getDescription(object)
```

Arguments

`object`	An object from the class Model.

Value

A list giving the description of a model.

getDesigns *Get the designs.*

Description

Get the designs.

Usage

```
getDesigns(object)

## S4 method for signature 'PFIMProject'
getDesigns(object)
```

Arguments

`object`	An object from the class PFIMProject.

Value

A list giving the designs of the object.

getDeterminant *Get the determinant of the fim.*

Description

Get the determinant of the fim.

Usage

```
getDeterminant(object)

## S4 method for signature 'Fim'
getDeterminant(object)

## S4 method for signature 'Evaluation'
getDeterminant(object)

## S4 method for signature 'Optimization'
getDeterminant(object)
```

Arguments

`object`	An object from the class Fim.

Value

A numeric giving the determinant of the fim.

getDistribution *Get the distribution.*

Description

Get the distribution.

Usage

```
getDistribution(object)

## S4 method for signature 'ModelParameter'
getDistribution(object)
```

Arguments

`object`	An object from the class ModelParameter.

Value

The parameter distribution.

`getDose` *getDose*

Description

Get the amount of doses.

Usage

```
getDose(object)

## S4 method for signature 'Administration'
getDose(object)

## S4 method for signature 'AdministrationConstraints'
getDose(object)
```

Arguments

`object`	An object `Administration` from the class Administration.

Value

The numeric `amount_dose` giving the amount of doses.

`getEigenValues` *Get the eigenvalues of the fim.*

Description

Get the eigenvalues of the fim.

Usage

```
getEigenValues(object)

## S4 method for signature 'Fim'
getEigenValues(object)
```

Arguments

`object`	An object from the class Fim.

Value

A vector giving the eigenvalues of the fim.

`getElementaryProtocols` *Get the elementary protocols.*

Description

Get the elementary protocols.

Usage

```
getElementaryProtocols(object, fims)

## S4 method for signature 'Optimization'
getElementaryProtocols(object, fims)
```

Arguments

`object`	An object from the class Optimization.
`fims`	A list of object from the class Fim.

Value

A list containing the results of the evaluation of the elementary protocols giving the numberOf-Times, nbOfDimensions, totalCost, samplingTimes and the fisherMatrices

---

`getEquation` *Get the equation of a model error.*

Description

Get the equation of a model error.

Usage

```
getEquation(object)

## S4 method for signature 'ModelError'
getEquation(object)
```

Arguments

`object`	An object from the class ModelError.

Value

An expression giving the equation of a model error.

---

getEquations *Get the equations of a model.*

Description

Get the equations of a model.

Usage

```
getEquations(object)

## S4 method for signature 'Model'
getEquations(object)
```

Arguments

`object`	An object from the class Model.

Value

The list giving the equations of the model.

---

getEquationsAfterInfusion *Get the equations after infusion.*

Description

Get the equations after infusion.

Usage

```
getEquationsAfterInfusion(object)

## S4 method for signature 'Model'
getEquationsAfterInfusion(object)
```

Arguments

`object`	An object from the class Model.

Value

A list giving the equations after the infusion.

getEquationsDuringInfusion

Get the equations during infusion.

Description

Get the equations during infusion.

Usage

```
getEquationsDuringInfusion(object)

## S4 method for signature 'Model'
getEquationsDuringInfusion(object)
```

Arguments

object	An object from the class Model.

Value

A list giving the equations during the infusion.

getEvaluationFIMResults

Get the results of the evaluation.

Description

Get the results of the evaluation.

Usage

```
getEvaluationFIMResults(object)

## S4 method for signature 'Optimization'
getEvaluationFIMResults(object)
```

Arguments

object	An object from the class Optimization.

Value

An object from the class Evaluation giving the evaluation results for the optimal design.

getEvaluationInitialDesignResults
Get the evaluation results of the initial design.

Description

Get the evaluation results of the initial design.

Usage

```
getEvaluationInitialDesignResults(object)

## S4 method for signature 'Optimization'
getEvaluationInitialDesignResults(object)
```

Arguments

`object`	An object from the class Optimization.

Value

The object from the class Evaluation giving the results of the evaluation of the initial design.

getFim
getFim

Description

Get the fim of an of an object.

Usage

```
getFim(object)

## S4 method for signature 'Design'
getFim(object)

## S4 method for signature 'PFIMProject'
getFim(object)

## S4 method for signature 'OptimizationAlgorithm'
getFim(object)
```

Arguments

`object`	An object defined form a class of PFIM.

Value

The `FIM` of the object.

`getFisherMatrix` *Get the FIM.*

Description

Get the FIM.

Usage

```
getFisherMatrix(object)

## S4 method for signature 'Fim'
getFisherMatrix(object)

## S4 method for signature 'Evaluation'
getFisherMatrix(object)

## S4 method for signature 'Optimization'
getFisherMatrix(object)
```

Arguments

`object`	An object from the class Fim.

Value

A matrix giving the FIM.

`getFixedEffects` *Get the matrix of fixed effects.*

Description

Get the matrix of fixed effects.

Usage

```
getFixedEffects(object)

## S4 method for signature 'Fim'
getFixedEffects(object)
```

Arguments

`object`	An object from the class Fim.

Value

The matrix of the fixed effects.

`getFixedMu` *Get the fixed effect.*

Description

Get the fixed effect.

Usage

```
getFixedMu(object)

## S4 method for signature 'ModelParameter'
getFixedMu(object)
```

Arguments

`object`	An object from the class ModelParameter.

Value

A boolean giving the fixed mu.

`getFixedOmega` *Get the fixed variance.*

Description

Get the fixed variance.

Usage

```
getFixedOmega(object)

## S4 method for signature 'ModelParameter'
getFixedOmega(object)
```

Arguments

`object`	An object from the class ModelParameter.

Value

A boolean giving the fixed omega.

`getFixedParameters` *Get the fixed parameters.*

Description

Get the fixed parameters.

Usage

```
getFixedParameters(object)

## S4 method for signature 'Model'
getFixedParameters(object)
```

Arguments

`object`	An object from the class Model.

Value

A list giving the fixed parameters of the model.

`getFixedTimes` *Get the fixed sampling times.*

Description

Get the fixed sampling times.

Usage

```
getFixedTimes(object)

## S4 method for signature 'SamplingTimeConstraints'
getFixedTimes(object)
```

Arguments

`object`	An object from the class SamplingTimeConstraints.

Value

A vector giving the foxed sampling times.

`getInitialConditions` *getInitialConditions*

Description

Get the initial condition for the evaluation of an ode model.

Usage

```
getInitialConditions(object)

## S4 method for signature 'Arm'
getInitialConditions(object)

## S4 method for signature 'Model'
getInitialConditions(object)
```

Arguments

`object`	An object `Arm` from the class Arm.

Value

The list `initialConditions` for the object `Arm`.

`getIterationAndCriteria` *Get the iteration with the convergence criteria.*

Description

Get the iteration with the convergence criteria.

Usage

```
getIterationAndCriteria(object)

## S4 method for signature 'OptimizationAlgorithm'
getIterationAndCriteria(object)
```

Arguments

`object`	An object from the class OptimizationAlgorithm.

Value

A dataframe giving the iteration with the convergence criteria.

getLambda *Get the parameter lambda.*

Description

Get the parameter lambda.

Usage

```
getLambda(object)

## S4 method for signature 'MultiplicativeAlgorithm'
getLambda(object)
```

Arguments

`object`	An object from the class MultiplicativeAlgorithm.

Value

A numeric giving the parameter lambda.

getLibraryPDModels *Get the library of PD models.*

Description

Get the library of PD models.

Usage

```
getLibraryPDModels(object)

## S4 method for signature 'LibraryOfModels'
getLibraryPDModels(object)
```

Arguments

`object`	An object from the class LibraryOfModels.

Value

A list giving the PD models.

`getLibraryPKModels` *Get the library of PK models.*

Description

Get the library of PK models.

Usage

```
getLibraryPKModels(object)

## S4 method for signature 'LibraryOfModels'
getLibraryPKModels(object)
```

Arguments

`object`	An object from the class LibraryOfModels.

Value

A list giving the PK models.

`getMinSampling` *Get the minimal sampling times.*

Description

Get the minimal sampling times.

Usage

```
getMinSampling(object)

## S4 method for signature 'SamplingTimeConstraints'
getMinSampling(object)
```

Arguments

`object`	An object from the class SamplingTimeConstraints.

Value

A numeric giving the minimal sampling times.

getModel *Get the model.*

Description

Get the model.

Usage

```
getModel(object)

## S4 method for signature 'PFIMProject'
getModel(object)
```

Arguments

`object`	An object from the class PFIMProject.

Value

The model of the object.

getModelEquations *Get the model equations.*

Description

Get the model equations.

Usage

```
getModelEquations(object)

## S4 method for signature 'PFIMProject'
getModelEquations(object)
```

Arguments

`object`	An object from the class PFIMProject.

Value

A list giving the model equations.

`getModelError` *Get the model error.*

Description

Get the model error.

Usage

```
getModelError(object)

## S4 method for signature 'Model'
getModelError(object)

## S4 method for signature 'PFIMProject'
getModelError(object)
```

Arguments

`object`	An object defined form a class of PFIM.

Value

The model error of the object.

`getModelErrorParametersValues` *Get the values of the model error parameters.*

Description

Get the values of the model error parameters.

Usage

```
getModelErrorParametersValues(object)

## S4 method for signature 'Model'
getModelErrorParametersValues(object)
```

Arguments

`object`	An object from the class Model.

Value

A list giving the values of the model error parameters.

`getModelFromLibrary` *Get a model from the library of models.*

Description

Get a model from the library of models.

Usage

```
getModelFromLibrary(object)

## S4 method for signature 'Model'
getModelFromLibrary(object)
```

Arguments

`object`	An object from the class Model.

Value

Return a model from the the library of models.

`getModelParameters` *Get the model parameters.*

Description

Get the model parameters.

Usage

```
getModelParameters(object)

## S4 method for signature 'PFIMProject'
getModelParameters(object)
```

Arguments

`object`	An object from the class PFIMProject.

Value

A list giving the model parameters.

`getModelParametersValues` *Get the values of the model parameters.*

Description

Get the values of the model parameters.

Usage

```
getModelParametersValues(object)

## S4 method for signature 'Model'
getModelParametersValues(object)
```

Arguments

`object`	An object from the class Model.

Value

A list giving the values of the model parameters.

`getMu` *getMu*

Description

Get the fixed effect of an object.

Usage

```
getMu(object)

## S4 method for signature 'Distribution'
getMu(object)

## S4 method for signature 'ModelParameter'
getMu(object)
```

Arguments

`object`	An object defined form a class of PFIM.

Value

The object with the updated fixed effect.

getName *getName*

Description

Get the name of an object

Usage

```
getName(object)

## S4 method for signature 'Arm'
getName(object)

## S4 method for signature 'Design'
getName(object)

## S4 method for signature 'ModelParameter'
getName(object)

## S4 method for signature 'LibraryOfModels'
getName(object)

## S4 method for signature 'Model'
getName(object)

## S4 method for signature 'PFIMProject'
getName(object)
```

Arguments

`object`	An object defined form a class of PFIM.

Value

A character string `name` giving the name of the object.

getNames *getNames*

Description

Get the names of an object.

Usage

```
getNames(object)

## S4 method for signature 'list'
getNames(object)
```

Arguments

`object`	An object defined form a class of PFIM.

Value

A vector giving the names of the object.

`getNumberOfArms` *getNumberOfArms*

Description

Get the number of arms in a design.

Usage

```
getNumberOfArms(object)

## S4 method for signature 'Design'
getNumberOfArms(object)
```

Arguments

`object`	An object `Design` from the class Design.

Value

A numeric `numberOfArms` giving the number of arms in the design.

`getNumberOfIterations` *Get the number of iterations.*

Description

Get the number of iterations.

Usage

```
getNumberOfIterations(object)

## S4 method for signature 'MultiplicativeAlgorithm'
getNumberOfIterations(object)
```

Arguments

`object`	An object from the class MultiplicativeAlgorithm.

Value

A numeric giving the number of iterations.

`getNumberOfParameters` *Get the number of parameters.*

Description

Get the number of parameters.

Usage

```
getNumberOfParameters(object)

## S4 method for signature 'Model'
getNumberOfParameters(object)
```

Arguments

`object`	An object from the class Model.

Value

A numeric giving the number of parameters of the model.

`getNumberOfsamplingsOptimisable`
Get the number of sampling times that are optimisable.

Description

Get the number of sampling times that are optimisable.

Usage

```
getNumberOfsamplingsOptimisable(object)

## S4 method for signature 'SamplingTimeConstraints'
getNumberOfsamplingsOptimisable(object)
```

Arguments

`object`	An object from the class SamplingTimeConstraints.

Value

A vector giving the number of sampling times that are optimisable.

`getNumberOfTimesByWindows`
Get the number of sampling times by windows.

Description

Get the number of sampling times by windows.

Usage

```
getNumberOfTimesByWindows(object)

## S4 method for signature 'SamplingTimeConstraints'
getNumberOfTimesByWindows(object)
```

Arguments

`object`	An object from the class SamplingTimeConstraints.

Value

A vector giving the number of sampling times by windows.

getOdeSolverParameters *getOdeSolverParameters*

Description

Get the parameters for the ode solvers of an object.

Usage

```
getOdeSolverParameters(object)

## S4 method for signature 'Model'
getOdeSolverParameters(object)

## S4 method for signature 'PFIMProject'
getOdeSolverParameters(object)
```

Arguments

`object`	An object defined form a class of PFIM.

Value

The list giving the parameters for the ode solvers.

getOmega *Get the matrix omega of an object.*

Description

Get the matrix omega of an object.

Usage

```
getOmega(object)

## S4 method for signature 'Distribution'
getOmega(object)

## S4 method for signature 'ModelParameter'
getOmega(object)
```

Arguments

`object`	An object defined form a class of PFIM.

Value

The matrix omega of an object.

`getOptimalDesign` *Get the optimal design.*

Description

Get the optimal design.

Usage

```
getOptimalDesign(object)

## S4 method for signature 'OptimizationAlgorithm'
getOptimalDesign(object)
```

Arguments

`object`	An object from the class OptimizationAlgorithm.

Value

The optimal design.

`getOptimalFrequencies` *Get the optimal frequencies*

Description

Get the optimal frequencies

Usage

```
getOptimalFrequencies(object)

## S4 method for signature 'FedorovWynnAlgorithm'
getOptimalFrequencies(object)
```

Arguments

`object`	An object from the class FedorovWynnAlgorithm.

Value

A vector giving the optimal frequencies

`getOptimalWeights` *Get the optimal weights.*

Description

Get the optimal weights.

Usage

```
getOptimalWeights(object)

## S4 method for signature 'MultiplicativeAlgorithm'
getOptimalWeights(object)
```

Arguments

`object`	An object from the class MultiplicativeAlgorithm.

Value

A vector giving the optimal weights.

`getOptimizationResults` *Get the optimization results.*

Description

Get the optimization results.

Usage

```
getOptimizationResults(object)

## S4 method for signature 'Optimization'
getOptimizationResults(object)
```

Arguments

`object`	An object from the class Optimization.

Value

An object from the class OptimizationAlgorithm giving the optimization results.

getOptimizer — *Get the optimization algorithm.*

Description

Get the optimization algorithm.

Usage

```
getOptimizer(object)

## S4 method for signature 'PFIMProject'
getOptimizer(object)
```

Arguments

`object`	An object from the class PFIMProject.

Value

A string giving the name of the optimization algorithm.

getOptimizerParameters — *Get the optimization parameters.*

Description

Get the optimization parameters.

Usage

```
getOptimizerParameters(object)

## S4 method for signature 'PFIMProject'
getOptimizerParameters(object)
```

Arguments

`object`	An object from the class PFIMProject.

Value

A list giving the optimization parameters.

getOutcome *getOutcome*

Description

Get the outcome of an object.

Usage

```
getOutcome(object)

## S4 method for signature 'Administration'
getOutcome(object)

## S4 method for signature 'AdministrationConstraints'
getOutcome(object)

## S4 method for signature 'ModelError'
getOutcome(object)

## S4 method for signature 'SamplingTimeConstraints'
getOutcome(object)

## S4 method for signature 'SamplingTimes'
getOutcome(object)
```

Arguments

`object`	An object defined from a class of PFIM.

Value

A string giving the outcome of the object.

getOutcomes *Get the outcomes of a model.*

Description

Get the outcomes of a model.

Usage

```
getOutcomes(object)

## S4 method for signature 'Model'
getOutcomes(object)

## S4 method for signature 'PFIMProject'
getOutcomes(object)
```

Arguments

`object`	An object from the class Model.

Value

A list giving the outcomes of the model.

`getOutcomesEvaluation` *getOutcomesEvaluation*

Description

Get the results of the evaluation of the outcomes.

Usage

```
getOutcomesEvaluation(object)

## S4 method for signature 'Design'
getOutcomesEvaluation(object)
```

Arguments

`object`	An object `Design` from the class Design.

Value

The list `outcomesEvaluation` containing the results of the design evaluation for the outcomes.

`getOutcomesForEvaluation` *Get the outcomes of a model used for the evaluation (is scales outcomes).*

Description

Get the outcomes of a model used for the evaluation (is scales outcomes).

Usage

```
getOutcomesForEvaluation(object)

## S4 method for signature 'Model'
getOutcomesForEvaluation(object)
```

Arguments

`object`	An object from the class Model.

Value

A list giving the outcomes of a model used for the evaluation (is scales outcomes).

`getOutcomesGradient` *getOutcomesGradient*

Description

Get the results of the evaluation of the outcome gradients.

Usage

```
getOutcomesGradient(object)

## S4 method for signature 'Design'
getOutcomesGradient(object)
```

Arguments

`object`	An object `Design` from the class Design.

Value

The list `outcomesGradient` containing the results of the design evaluation for the outcome gradients.

getParameters — *Get the parameters of an object.*

Description

Get the parameters of an object.

Usage

```
getParameters(object)

## S4 method for signature 'ModelError'
getParameters(object)

## S4 method for signature 'Distribution'
getParameters(object)

## S4 method for signature 'Model'
getParameters(object)
```

Arguments

`object`	An object defined form a class of PFIM.

Value

Return the list of the parameters of the object.

getPDModel — *Get a PD model.*

Description

Get a PD model.

Usage

```
getPDModel(object, PDModelName)

## S4 method for signature 'LibraryOfPKPDModels'
getPDModel(object, PDModelName)
```

Arguments

`object`	An object from the class LibraryOfPKPDModels.
`PDModelName`	A string giving the name of the PD model.

Value

Return a PD model.

---

getPKModel *Get a PK model.*

Description

Get a PK model.

Usage

```
getPKModel(object, PKModelName)

## S4 method for signature 'LibraryOfPKPDModels'
getPKModel(object, PKModelName)
```

Arguments

object	An object from the class LibraryOfPKPDModels.
PKModelName	A string giving the name of the PK model.

Value

Return a PK model.

---

getPKPDModel *Get a PKPD model.*

Description

Get a PKPD model.

Usage

```
getPKPDModel(object, namesModel)

## S4 method for signature 'LibraryOfPKPDModels'
getPKPDModel(object, namesModel)
```

Arguments

object	An object from the class LibraryOfPKPDModels.
namesModel	A vector of strings giving the names of the PK and PD models.

Value

Return a PKPD model.

getPlotOptions — *Get the plot options for graphs responses and SI*

Description

Get the plot options for graphs responses and SI

Usage

```
getPlotOptions(plotOptions, outcomesNames)
```

Arguments

plotOptions	A list giving the plots options.
outcomesNames	A list giving the output names.

Value

The list containing the plot options.

getProportionsOfSubjects — *Get the proportion of subjects.*

Description

Get the proportion of subjects.

Usage

```
getProportionsOfSubjects(object)

## S4 method for signature 'Optimization'
getProportionsOfSubjects(object)
```

Arguments

object	An object from the class Optimization.

Value

A vector giving the proportion of subjects.

getRSE *Get the RSE*

Description

Get the RSE

Usage

```
getRSE(object, model)

## S4 method for signature 'BayesianFim'
getRSE(object, model)

## S4 method for signature 'Evaluation'
getRSE(object, model)

## S4 method for signature 'IndividualFim'
getRSE(object, model)

## S4 method for signature 'Optimization'
getRSE(object, model)

## S4 method for signature 'PopulationFim'
getRSE(object, model)
```

Arguments

`object`	An object from the class Fim.
`model`	An object from the class Model.

Value

A vector giving the RSE.

getSamplings *Get the sampling of an object.*

Description

Get the sampling of an object.

Usage

```
getSamplings(object)

## S4 method for signature 'SamplingTimeConstraints'
getSamplings(object)

## S4 method for signature 'SamplingTimes'
getSamplings(object)
```

Arguments

`object`	An object defined form a class of PFIM.

Value

A list of the samplings of the object.

`getSamplingsWindows` *Get the windows for the sampling times.*

Description

Get the windows for the sampling times.

Usage

```
getSamplingsWindows(object)

## S4 method for signature 'SamplingTimeConstraints'
getSamplingsWindows(object)
```

Arguments

`object`	An object from the class SamplingTimeConstraints.

Value

A list giving the vector of the windows for the sampling times.

getSamplingTime *getSamplingTime*

Description

Get the sampling times by outcome.

Usage

```
getSamplingTime(object, outcome)

## S4 method for signature 'Arm'
getSamplingTime(object, outcome)
```

Arguments

`object`	An object `Arm` from the class Arm.
`outcome`	A string giving the name of the outcome.

Value

The element of the list `samplingTimes` containing the sampling times of the outcome `outcome`

getSamplingTimeConstraint *getSamplingTimeConstraint*

Description

Get the sampling times constraints by outcome.

Usage

```
getSamplingTimeConstraint(object, outcome)

## S4 method for signature 'Arm'
getSamplingTimeConstraint(object, outcome)
```

Arguments

`object`	An object `Arm` from the class Arm.
`outcome`	A string giving the name of the outcome.

Value

The element of the list `samplingTimesConstraints` containing the sampling times constraints of the outcome `outcome`

`getSamplingTimes` *getSamplingTimes*

Description

Get the vectors of sampling times for an arm.

Usage

```
getSamplingTimes(object)

## S4 method for signature 'Arm'
getSamplingTimes(object)
```

Arguments

`object`	An object `Arm` from the class Arm.

Value

The list `samplingTimes` for the object `Arm`.

`getSamplingTimesConstraints` *getSamplingTimesConstraints*

Description

Get the sampling times constraints.

Usage

```
getSamplingTimesConstraints(object)

## S4 method for signature 'Arm'
getSamplingTimesConstraints(object)
```

Arguments

`object`	An object `Arm` from the class Arm.

Value

The list `getSamplingTimesConstraints`.

getSE *Get the SE.*

Description

Get the SE.

Usage

```
getSE(object)

## S4 method for signature 'Fim'
getSE(object)

## S4 method for signature 'Evaluation'
getSE(object)

## S4 method for signature 'Optimization'
getSE(object)
```

Arguments

`object`	An object from the class Fim.

Value

A vector giving the SE.

getShrinkage *Get the shrinkage.*

Description

Get the shrinkage.

Usage

```
getShrinkage(object)

## S4 method for signature 'BayesianFim'
getShrinkage(object)

## S4 method for signature 'Evaluation'
getShrinkage(object)

## S4 method for signature 'IndividualFim'
```

```
getShrinkage(object)

## S4 method for signature 'Optimization'
getShrinkage(object)

## S4 method for signature 'PopulationFim'
getShrinkage(object)
```

Arguments

`object`	An object from the class Fim.

Value

A vector giving the shrinkage of the Bayesian fim.

`getSigmaInter` *Get the parameter sigma inter.*

Description

Get the parameter sigma inter.

Usage

```
getSigmaInter(object)

## S4 method for signature 'ModelError'
getSigmaInter(object)
```

Arguments

`object`	An object from the class ModelError.

Value

A numeric giving the parameter sigma inter.

getSigmaSlope *Get the parameter sigma slope.*

Description

Get the parameter sigma slope.

Usage

```
getSigmaSlope(object)

## S4 method for signature 'ModelError'
getSigmaSlope(object)
```

Arguments

`object`	An object from the class ModelError.

Value

A numeric giving the parameter sigma slope.

getSize *getSize*

Description

Get the size of an object.

Usage

```
getSize(object)

## S4 method for signature 'Arm'
getSize(object)

## S4 method for signature 'Design'
getSize(object)
```

Arguments

`object`	An object defined form a class of PFIM.

Value

A numeric giving the size of the object.

getTau *getTau*

Description

Get the frequency tau.

Usage

```
getTau(object)

## S4 method for signature 'Administration'
getTau(object)
```

Arguments

object	An object Administration from the class Administration.

Value

The numeric tau giving the frequency tau.

getTimeDose *getTimeDose*

Description

Get the times vector when doses are given.

Usage

```
getTimeDose(object)

## S4 method for signature 'Administration'
getTimeDose(object)
```

Arguments

object	An object Administration from the class Administration.

Value

The vector timeDose giving the times when the doses are given.

getTinf *Get the infusion duration.*

Description

Get the infusion duration.

Usage

```
getTinf(object)

## S4 method for signature 'Administration'
getTinf(object)
```

Arguments

`object`	An object `Administration` from the class Administration.

Value

The numeric `Tinf` giving the infusion duration Tinf.

getVarianceEffects *Get the matrix of the variance effects.*

Description

Get the matrix of the variance effects.

Usage

```
getVarianceEffects(object)

## S4 method for signature 'Fim'
getVarianceEffects(object)
```

Arguments

`object`	An object from the class Fim.

Value

The matrix of the variance effects.

`IndividualFim-class` *Class "Fim"*

Description

A class storing information regarding the individual Fisher matrix. The class `IndividualFim` inherits from the class `Fim`.

`isDoseInEquations` *Test if the dose is in the equations of the model.*

Description

Test if the dose is in the equations of the model.

Usage

```
isDoseInEquations(object)

## S4 method for signature 'Model'
isDoseInEquations(object)
```

Arguments

`object`	An object from the class Model.

Value

Return a Boolean giving if the dose is in the equations of the model.

`isModelAnalytic` *Test if a mode is analytic.*

Description

Test if a mode is analytic.

Usage

```
isModelAnalytic(object)

## S4 method for signature 'Model'
isModelAnalytic(object)
```

Arguments

`object`	An object from the class Model.

Value

Return a Boolean giving if the mode is analytic or not.

`isModelBolus` *Test if a mode is bolus.*

Description

Test if a mode is bolus.

Usage

```
isModelBolus(object, designs)

## S4 method for signature 'Model'
isModelBolus(object, designs)
```

Arguments

`object`	An object from the class Model.
`designs`	A list of objects from the class Design.

Value

Return a Boolean giving if the mode is bolus or not.

`isModelInfusion` *Test if a mode is infusion*

Description

Test if a mode is infusion

Usage

```
isModelInfusion(object)

## S4 method for signature 'Model'
isModelInfusion(object)
```

Arguments

`object`	An object from the class Model.

Value

Return a Boolean giving if the mode is infusion or not.

`isModelODE` *Test if a mode is ode.*

Description

Test if a mode is ode.

Usage

```
isModelODE(object)

## S4 method for signature 'Model'
isModelODE(object)
```

Arguments

`object`	An object from the class Model.

Value

Return a Boolean giving if the mode is ode or not.

`isModelSteadyState` *Test if a mode is steady state.*

Description

Test if a mode is steady state.

Usage

```
isModelSteadyState(object)

## S4 method for signature 'Model'
isModelSteadyState(object)
```

Arguments

`object`	An object from the class Model.

Value

Return a Boolean giving if the mode is steady state or not.

`LibraryOfModels-class` *Class "LibraryOfModels"*

Description

The class `LibraryOfModels` represents the library of models.

Objects from the class

Objects form the class `LibraryOfModels` can be created by calls of the form `LibraryOfModels(...)` where (...) are the parameters for the `LibraryOfModels` objects.

Slots for `LibraryOfModels` objects

`name`**:** A string giving the name of the library of models.

`content`**:** A list giving the content of the library of model.

`LibraryOfPDModels` *Library of the PK models*

Description

Library of the PK models

Usage

```
LibraryOfPDModels()
```

`LibraryOfPKModels` *Library of the PK models*

Description

Library of the PK models

Usage

```
LibraryOfPKModels()
```

`LibraryOfPKPDModels-class` *Class "LibraryOfPKPDModels"*

Description

The class `LibraryOfPKPDModels` represents the library of PKPD models. The class `LibraryOfPKPDModels` inherits from the class `LibraryOfModels`.

`LogNormal-class` *Class "LogNormal"*

Description

The class defines all the required methods for a LogNormal distribution object. The class `LogNormal` inherits from the class `Distribution`.

`Model-class` *Class "Model"*

Description

The class `Model` defines information concerning the construction of a model.

Objects from the class

Objects form the class `Model` can be created by calls of the form `Model(...)` where (...) are the parameters for the `Model` objects.

Slots for `Administration` objects

`name`**:** A string giving the name of the model.

`description`**:** A list of string giving the description of the model.

`equations`**:** A list giving the equations of the model.

`outcomes`**:** A list giving the outcomes of the model.

`outcomesForEvaluation`**:** A list giving the outcomes used for the evaluation of the model.

`parameters`**:** A list giving the parameters of the model.

`modelError`**:** A list giving the model error of the model.

`initialConditions`**:** A list giving the initial conditions of the model.

`odeSolverParameters`**:** A list giving the parameters for the solver of the model.

`modelFromLibrary`**:** A list giving the model equations when the model is constructed from the library of model.

`ModelAnalytic-class` *Class "ModelAnalytic"*

Description

The class `Model` defines information concerning the construction of an analytical model. The class `ModelAnalytic` inherits from the class `Model`.

`ModelAnalyticBolus-class` *Class "ModelAnalyticBolus"*

Description

The class `Model` defines information concerning the construction of an analytical bolus model. The class `ModelAnalyticBolus` inherits from the class `ModelAnalytic`.

`ModelAnalyticBolusSteadyState-class` *Class "ModelAnalyticBolusSteadyState"*

Description

The class `Model` defines information concerning the construction of an analytical model in steady state. The class `ModelAnalyticBolusSteadyState` inherits from the class `ModelAnalyticSteadyState`.

`ModelAnalyticInfusion-class` *Class "ModelAnalyticInfusion"*

Description

The class `Model` defines information concerning the construction of an analytical model in infusion. The class `ModelAnalyticInfusion` inherits from the class `ModelInfusion`.

`ModelAnalyticInfusionSteadyState-class` *Class "ModelAnalyticInfusionSteadyState"*

Description

The class `Model` defines information concerning the construction of an analytical model in infusion in steady state. The class `ModelAnalyticInfusionSteadyState` inherits from the class `ModelAnalyticInfusion`.

`ModelAnalyticSteadyState-class` *Class "ModelAnalyticSteadyState"*

Description

The class `ModelAnalyticSteadyState` defines information concerning the construction of an analytical model steady state. The class `ModelAnalyticSteadyState` inherits from the class `ModelAnalytic`.

`ModelBolus-class` *Class "ModelBolus"*

Description

...

`ModelError-class` *Class "ModelError" representing a Model error.*

Description

...

`ModelInfusion-class` *Class "ModelInfusion"*

Description

...

`ModelODE-class` *Class "ModelODE"*

Description

The class `ModelODE` defines information concerning the construction of an ode model. The class `ModelODE` inherits from the class `Model`.

`ModelODEBolus-class` *Class "ModelODEBolus"*

Description

The class `ModelODEBolus` defines information concerning the construction of an ode model bolus. The class `ModelODEBolus` inherits from the class `ModelBolus`.

`ModelODEDoseInEquations-class` *Class "ModelODEDoseInEquations"*

Description

The class `ModelODEDoseInEquations` defines information concerning the construction of an ode model where the dose is in the model equations. The class `ModelODEDoseInEquations` inherits from the class `ModelODE`.

`ModelODEDoseNotInEquations-class` *Class "ModelODEDoseNotInEquations"*

Description

...

`ModelODEInfusion-class` *Class "ModelODEInfusion"*

Description

The class `ModelODEInfusion` defines information concerning the construction of an ode model in infusion. The class `ModelODEInfusion` inherits from the class `ModelInfusion`.

`ModelODEInfusionDoseInEquations-class` *Class "ModelODEInfusionDoseInEquations"*

Description

The class `ModelODEInfusionDoseInEquations` defines information concerning the construction of an ode model in infusion where the dose is in the model equations. The class `ModelODEInfusionDoseInEquations` inherits from the class `ModelODEInfusion`.

`ModelParameter-class` *Class "ModelParameter"*

Description

The class `ModelParameter` defines information concerning the model parameters.

Objects from the class

Objects form the class `ModelParameter` can be created by calls of the form `ModelParameter(...)` where (...) are the parameters for the `ModelParameter` objects.

Slots for `ModelParameter` objects

`name`**:** A string giving the name of the parameter.

`distribution`**:** An object from the class `Distribution` giving the distribution of the parameter.

`fixedMu`**:** A boolean giving if mu is fixed or not.

`fixedOmega`**:** A boolean giving if omega is fixed or not.

`MultiplicativeAlgorithm-class` *Class "MultiplicativeAlgorithm"*

Description

The class `MultiplicativeAlgorithm` implements the multiplicative algorithm.

Objects from the class

Objects form the class `MultiplicativeAlgorithm` can be created by calls of the form `MultiplicativeAlgorithm(...)` where (...) are the parameters for the `MultiplicativeAlgorithm` objects.

Slots for `MultiplicativeAlgorithm` objects

`arms`**:** A list giving the arms.

`lambda`**:** A numeric giving the lambda parameter of the multiplicative algorithm.

`delta`**:** A numeric giving the delta parameter of the multiplicative algorithm.

`numberOfIterations`**:** A numeric giving the maximal number iteration of the optimization process.

`optimalWeights`**:** A vector giving the optimal weights.

`optimalDesign`**:** An object of the class `Design` giving the optimal design.

`showProcess`**:** A boolean for showing or not the process of optimization.

MultiplicativeAlgorithm_Rcpp

Function MultiplicativeAlgorithm_Rcpp

Description

Run the MultiplicativeAlgorithm_Rcpp in Rcpp

Usage

```
MultiplicativeAlgorithm_Rcpp(
  fisherMatrices_input,
  numberOfFisherMatrices_input,
  weights_input,
  numberOfParameters_input,
  dim_input,
  lambda_input,
  delta_input,
  iterationInit_input
)
```

Arguments

`fisherMatrices_input`	fisherMatrices_input
`numberOfFisherMatrices_input`	numberOfFisherMatrices_input
`weights_input`	weights_input
`numberOfParameters_input`	numberOfParameters_input
`dim_input`	dim_input
`lambda_input`	lambda_input
`delta_input`	delta_input
`iterationInit_input`	iterationInit_input

`Normal-class` *Class "Normal"*

Description

The class defines all the required methods for a Normal distribution object. The class `Normal` inherits from the class `Distribution`.

`Optimization-class` *Class "Optimization"*

Description

A class storing information concerning the design optimization.

Objects from the class

Objects form the class `Optimization` can be created by calls of the form `Optimization(...)` where (...) are the parameters for the `Optimization` objects.

Slots for `Administration` objects

`name`**:** A character string giving the name of the optimization process.

`model`**:** A object of class `Model` giving the model.

`modelEquations`**:** A list giving the model equations.

`modelParameters`**:** A list giving the model parameters.

`modelError`**:** A list giving the model error.

`optimizer`**:** A object of class `OptimizationAlgorithm` giving the optimization algorithm.

`optimizerParameters`**:** A list giving the parameters of the optimization algorithm.

`outcomes`**:** A list giving the outcomes of the model.

`designs`**:** A list giving the designs to be optimized.

`fim`**:** A object of class `FIM` giving the Fisher information matrix.

`odeSolverParameters`**:** A list giving the parameters for the ode solver.

`optimizationResults`**:** A object of class `OptimizationAlgorithm` giving the results of the optimization.

`evaluationFIMResults`**:** A object of class `Evaluation` giving the results of the evaluation of the optimal design.

`evaluationInitialDesignResults`**:** A object of class `Evaluation` giving the results of the evaluation of the initial design.

OptimizationAlgorithm-class *Class "OptimizationAlgorithm"*

Description

A class storing information concerning the optimization algorithm.

Objects from the class

Objects form the class `OptimizationAlgorithm` can be created by calls of the form `OptimizationAlgorithm(...)` where (...) are the parameters for the `OptimizationAlgorithm` objects.

Slots for `Administration` objects

`name`**:** A character string giving the name of the optimization algorithm.

`parameters`**:** A list giving the parameters of the optimization algorithm.

optimize *Optimize a design.*

Description

Optimize a design.

Usage

```
optimize(object, optimizerParameters, optimizationObject)

## S4 method for signature 'FedorovWynnAlgorithm'
optimize(object, optimizerParameters, optimizationObject)

## S4 method for signature 'MultiplicativeAlgorithm'
optimize(object, optimizerParameters, optimizationObject)

## S4 method for signature 'PGBOAlgorithm'
optimize(object, optimizationObject)

## S4 method for signature 'PSOAlgorithm'
optimize(object, optimizationObject)

## S4 method for signature 'SimplexAlgorithm'
optimize(object, optimizerParameters, optimizationObject)
```

Arguments

`object`	An object from the class OptimizationAlgorithm.
`optimizerParameters`	A list giving the optimization parameters.
`optimizationObject`	An object giving the optimization algorithm.

Value

A list giving the results if the optimization.

`parametersForComputingGradient` *Define the parameters for computing the gradients of a model.*

Description

Define the parameters for computing the gradients of a model.

Usage

```
parametersForComputingGradient(object)

## S4 method for signature 'Model'
parametersForComputingGradient(object)
```

Arguments

`object`	An object from the class Model.

Value

A list giving the parameters for computing the gradients of a model.

`PFIMProject-class` *Class "PFIMProject"*

Description

A class storing information concerning a PFIM project.

Objects from the class

Objects form the class `PFIMProject` can be created by calls of the form `PFIMProject(...)` where (...) are the parameters for the `PFIMProject` objects.

Slots for `PFIMProject` objects

`name`**:** A character string giving the name of the PFIM project.

`description`**:** A list giving the description of the PFIM project.

`PGBOAlgorithm-class` *Class "PGBOAlgorithm"*

Description

The class "PGBOAlgorithm" implements the PGBO algorithm: Population Genetics Based Optimizer, developed by Hervé Le Nagard [1].

Objects from the Class `PGBOAlgorithm`

Objects form the Class `PGBOAlgorithm` can be created by calls of the form `PGBOAlgorithm(...)` where (...) are the parameters for the `PGBOAlgorithm` objects.

Slots for `PGBOAlgorithm` objects

`N`**:** A numeric giving the population size.

`muteEffect`**:** A numeric giving the mutation effect.

`maxIteration`**:** A numeric giving the maximum number of iterations.

`seed`**:** A numeric giving the seed.

`showProcess`**:** A boolean to show or not the process.

`optimalDesign`**:** A `Design` object giving the optimal design.

`iterationAndCriteria`**:** A list giving the optimal criteria at each iteration.

References

[1] Rebecca Bauer, France Mentré, Halima Kaddouri, Jacques Le Bras, Hervé Le Nagard, Benefits of a new Metropolis-Hasting based algorithm, in non-linear regression for estimation of ex vivo antimalarial sensitivity in patients infected with two strains, Computers in Biology and Medicine, Volume 55, 2014, Pages 16-25, ISSN 0010-4825

`plotEvaluation` *Graphs of the results of the evaluation.*

Description

Graphs of the results of the evaluation.

Usage

```
plotEvaluation(object, plotOptions)

## S4 method for signature 'Evaluation'
plotEvaluation(object, plotOptions)
```

Arguments

`object`	An object from the class Evaluation.
`plotOptions`	A list giving the plot options.

Value

A list giving the graphs for the evaluation of the responses and sensitivity indices.

`PlotEvaluation-class` *Class "PlotEvaluation"*

Description

A class storing information concerning the design evaluation. The class `PlotEvaluation` inherits from the class `Evaluation`.

`plotFrequencies` *Graph of the frequencies for the FW algorithm.*

Description

Graph of the frequencies for the FW algorithm.

Usage

```
plotFrequencies(object, threshold)

## S4 method for signature 'FedorovWynnAlgorithm'
plotFrequencies(object, threshold)

## S4 method for signature 'Optimization'
plotFrequencies(object, threshold)
```

Arguments

`object`	An object from the class OptimizationAlgorithm.
`threshold`	A numeric giving the threshold for the frequencies for the FW algorithm.

Value

The graphs of the frequencies for the FW algorithm.

`plotOutcomesEvaluation` *plotOutcomesEvaluation*

Description

Plot the evaluation of the outcomes.

Usage

```
plotOutcomesEvaluation(object, initialDesign, model, plotOptions)

## S4 method for signature 'Design'
plotOutcomesEvaluation(object, initialDesign, model, plotOptions)
```

Arguments

`object`	An object `Design` from the class Design.
`initialDesign`	An object `design` from the class Design.
`model`	An object `model` from the class Model.
`plotOptions`	A list containing the plot options.

Value

A list containing the plots the evaluation of the outcomes.

`plotOutcomesGradient` *plotOutcomesGradient*

Description

Plot the evaluation of the outcome gradients.

Usage

```
plotOutcomesGradient(object, initialDesign, model, plotOptions)

## S4 method for signature 'Design'
plotOutcomesGradient(object, initialDesign, model, plotOptions)
```

Arguments

`object`	An object `design` from the class Design.
`initialDesign`	An object `design` from the class Design.
`model`	An object `model` from the class Model.
`plotOptions`	A list containing the plot options.

Value

A list containing the plots the evaluation of the outcome gradients..

`plotRSE` *Graph of the RSE.*

Description

Graph of the RSE.

Usage

```
plotRSE(object, plotOptions)

## S4 method for signature 'PFIMProject'
plotRSE(object, plotOptions)
```

Arguments

`object`	An object from the class Evaluation.
`plotOptions`	A list giving the plot options.

Value

A graph of the RSE.

plotSE *Graph the SE.*

Description

Graph the SE.

Usage

```
plotSE(object, plotOptions)

## S4 method for signature 'PFIMProject'
plotSE(object, plotOptions)
```

Arguments

`object`	An object from the class Evaluation.
`plotOptions`	A list giving the plot options.

Value

A graph of the SE.

plotSensitivityIndice *Graphs of the results of the evaluation.*

Description

Graphs of the results of the evaluation.

Usage

```
plotSensitivityIndice(object, plotOptions)

## S4 method for signature 'Evaluation'
plotSensitivityIndice(object, plotOptions)
```

Arguments

`object`	An object from the class Evaluation.
`plotOptions`	A list giving the plot options.

Value

A list giving the graphs for the evaluation of the responses and sensitivity indices.

`plotShrinkage` *Graph of the shrinkage.*

Description

Graph of the shrinkage.

Usage

```
plotShrinkage(object, plotOptions)

## S4 method for signature 'PFIMProject'
plotShrinkage(object, plotOptions)
```

Arguments

`object`	An object from the class Evaluation.
`plotOptions`	A list giving the plot options.

Value

A graph of the shrinkage.

`plotWeights` *Graph of the weights for the multiplicative algorithm.*

Description

Graph of the weights for the multiplicative algorithm.

Usage

```
plotWeights(object, threshold)

## S4 method for signature 'MultiplicativeAlgorithm'
plotWeights(object, threshold)

## S4 method for signature 'Optimization'
plotWeights(object, threshold)
```

Arguments

`object`	An object from the class OptimizationAlgorithm.
`threshold`	A numeric giving the threshold for the optimal weights in the multiplicative algorithm.

Value

The graphs of the weights for the multiplicative algorithm.

`PopulationFim-class` *Class "PopulationFim"*

Description

A class storing information regarding the population Fisher matrix. The class `PopulationFim` inherits from the class `Fim`.

`Proportional-class` *Class "Proportional"*

Description

The Class "Proportional" defines the the residual error variance according to the formula g(sigma_inter, sigma_slope, c_error, f(x, theta)) = sigma_slope*f(x,theta).

Objects from the Class Proportional

Objects are typically created by calls to `Proportional` and contain the following slots that are inherited from the class Combined1:

Slots for the `Proportional` objects

`.Object`**:** An object of the Class `Proportional`

`sigma_inter`**:** A numeric value giving the sigma inter of the error model

`sigma_slope`**:** A numeric value giving the sigma slope of the error model

`PSOAlgorithm-class` *Class "PSOAlgorithm"*

Description

The class "PSOAlgorithm" implements the PSO algorithm.

Objects from the class `PSOAlgorithm`

Objects form the class `PSOAlgorithm` can be created by calls of the form `PSOAlgorithm(...)` where (...) are the parameters for the `PSOAlgorithm` objects.

Slots for `PSOAlgorithm` objects

`maxIteration`**:** A numeric giving the maximum of iterations.

`populationSize`**:** A numeric giving the population size.

`seed`**:** A numeric giving the seed.

`personalLearningCoefficient`**:** A numeric giving the personal learning coefficient.

`globalLearningCoefficient`**:** A numeric giving the global learning coefficient.

`showProcess`**:** A boolean to show or not the process.

`optimalDesign`**:** A `Design` object giving the optimal design.

`iterationAndCriteria`**:** A list giving the optimal criteria at each iteration.

`Report` *Report*

Description

Report

Usage

```
Report(object, outputPath, outputFile, plotOptions)

## S4 method for signature 'Evaluation'
Report(object, outputPath, outputFile, plotOptions)

## S4 method for signature 'Optimization'
Report(object, outputPath, outputFile, plotOptions)
```

Arguments

`object`	An object from the class PFIMProject.
`outputPath`	A string giving the output path.
`outputFile`	A string giving the name of the output file.
`plotOptions`	A list giving the plot options.

Value

The report in html.

`reportTablesAdministration` *reportTablesAdministration*

Description

Generate table for the report.

Usage

```
reportTablesAdministration(object)

## S4 method for signature 'Design'
reportTablesAdministration(object)
```

Arguments

`object`	An object `design` from the class Design.

Value

A table of the administration parameters for the report.

`reportTablesDesign` *reportTablesDesign*

Description

Generate table for the report.

Usage

```
reportTablesDesign(object)

## S4 method for signature 'Design'
reportTablesDesign(object)
```

Arguments

`object`	An object `design` from the class Design.

Value

A table of the design parameters for the report.

`reportTablesFIM` *Generate the tables for the report.*

Description

Generate the tables for the report.

Usage

```
reportTablesFIM(object, evaluationObject)

## S4 method for signature 'BayesianFim'
reportTablesFIM(object, evaluationObject)

## S4 method for signature 'IndividualFim'
reportTablesFIM(object, evaluationObject)

## S4 method for signature 'PopulationFim'
reportTablesFIM(object, evaluationObject)
```

Arguments

`object`	An object from the class Fim.
`evaluationObject`	A list giving the results of the evaluation of the model.

Value

A list giving the table in kable format for the report.

reportTablesModelError *Generate the tables for model errors for the evaluation report.*

Description

Generate the tables for model errors for the evaluation report.

Usage

```
reportTablesModelError(object)

## S4 method for signature 'Model'
reportTablesModelError(object)
```

Arguments

`object`	An object from the class Model.

Value

A kable table for the evaluation report.

reportTablesModelParameters *Generate the tables for model parameters for the evaluation report.*

Description

Generate the tables for model parameters for the evaluation report.

Usage

```
reportTablesModelParameters(object)

## S4 method for signature 'Model'
reportTablesModelParameters(object)
```

Arguments

`object`	An object from the class Model.

Value

A kable table for the evaluation report.

`reportTablesPlot` *reportTablesPlot*

Description

Generate all the table for the evaluation report

Usage

```
reportTablesPlot(object, plotOptions)

## S4 method for signature 'Evaluation'
reportTablesPlot(object, plotOptions)
```

Arguments

`object`	An object `evaluation` from the class Evaluation.
`plotOptions`	A list containing the options for the plots.

Value

The list `tables` containing the tables for the evaluation report.

`reportTablesSamplingConstraints` *reportTablesSamplingConstraints*

Description

Generate table for the report.

Usage

```
reportTablesSamplingConstraints(object)

## S4 method for signature 'Design'
reportTablesSamplingConstraints(object)
```

Arguments

`object`	An object `design` from the class Design.

Value

A table of the sampling constraints parameters for the report.

`resizeFisherMatrix` *Resize the fisher Matrix from a vector to a matrix.*

Description

Resize the fisher Matrix from a vector to a matrix.

Usage

```
resizeFisherMatrix(nbOfDimensions, fisherMatrix)

## S4 method for signature 'ANY'
resizeFisherMatrix(nbOfDimensions, fisherMatrix)
```

Arguments

`nbOfDimensions`	: a numeric for the dimensions of the fisher matrix.
`fisherMatrix`	: a vector that contain the low triangular Fisher matrix + its main diagonal.

Value

The Fisher matrix of size nbOfDimensions*nbOfDimensions

`run` *run*

Description

run

Usage

```
run(object)

## S4 method for signature 'Evaluation'
run(object)

## S4 method for signature 'Optimization'
run(object)
```

Arguments

`object`	An object from the class PFIMProject.

Value

A list giving the results of evaluation or optimization.

`SamplingTimeConstraints-class` *Class "SamplingTimeConstraints"*

Description

The class "SamplingTimeConstraints" implements the constraints for the sampling times.

Objects from the class `SamplingTimeConstraints`

Objects form the class `SamplingTimeConstraints` can be created by calls of the form `SamplingTimeConstraints(...)` where (...) are the parameters for the `SamplingTimeConstraints` objects.

Slots for `SamplingTimeConstraints` objects

`outcome`**:** A string giving the outcome.

`initialSamplings`**:** A vector giving the sampling times.

`fixedTimes`**:** A vector giving the fixed sampling times.

`numberOfsamplingsOptimisable`**:** A vector giving the sampling times to be optimized.

`samplingsWindows`**:** A list giving the windows for the sampling times.

`numberOfTimesByWindows`**:** A vector giving the number of sampling times by windows.

`minSampling`**:** A numeric giving the minimal sampling times.

`SamplingTimes-class` *Class "SamplingTimes"*

Description

The class "SamplingTimes" implements the sampling times.

Objects from the class `SamplingTimes`

Objects form the class `SamplingTimes` can be created by calls of the form `SamplingTimes(...)` where (...) are the parameters for the `SamplingTimes` objects.

Slots for `SamplingTimes` objects

`outcome`**:** A string giving the outcome.

`samplings`**:** A vector giving the sampling times.

`setAdministrations` *setAdministrations*

Description

Set all the administration for an arm.

Usage

```
setAdministrations(object, administrations)

## S4 method for signature 'Arm'
setAdministrations(object, administrations)
```

Arguments

`object`	An object `Arm` from the class Arm.
`administrations`	A list `administrations` of objects from the class `Administration` class giving the parameters of the administration for the object `Arm`.

Value

The object `Arm` with the list `administrations` of objects from the class `Administration` class giving the parameters of the administration for the object `Arm`.

`setArm` *setArm*

Description

Set the arms in a design.

Usage

```
setArm(object, arm)

## S4 method for signature 'Design'
setArm(object, arm)
```

Arguments

`object`	An object `Design` from the class Design.
`arm`	A list of object `Arm` giving the arms of the design.

Value

An object `Design` with the list `Arm` updated.

setArms — *Set the arms of an object.*

Description

Set the arms of an object.

Usage

```
setArms(object, arms)

## S4 method for signature 'Design'
setArms(object, arms)

## S4 method for signature 'OptimizationAlgorithm'
setArms(object, arms)
```

Arguments

object	An object defined form a class of PFIM.
arms	A list of arms.

Value

The object with the updated arms.

setcError — *Set the parameter c.*

Description

Set the parameter c.

Usage

```
setcError(object, cError)

## S4 method for signature 'ModelError'
setcError(object, cError)
```

Arguments

object	An object from the class ModelError.
cError	A numeric giving the parameter c.

Value

The model error with the parameter c.

---

setContent — *Set content of a library of models.*

Description

Set content of a library of models.

Usage

```
setContent(object, content)

## S4 method for signature 'LibraryOfModels'
setContent(object, content)
```

Arguments

`object`	An object from the class LibraryOfModels.
`content`	A list giving the content of the library of models.

Value

The library of models with the updated content.

---

setDerivatives — *Set the derivatives of the model error equation.*

Description

Set the derivatives of the model error equation.

Usage

```
setDerivatives(object, derivatives)

## S4 method for signature 'ModelError'
setDerivatives(object, derivatives)
```

Arguments

`object`	An object from the class ModelError.
`derivatives`	The derivatives of the model error equation.

Value

The model error with the updated model error equation.

setDescription *Set the description of a model.*

Description

Set the description of a model.

Usage

```
setDescription(object, description)

## S4 method for signature 'Model'
setDescription(object, description)
```

Arguments

`object`	An object from the class Model.
`description`	A list giving the description of a model.

Value

The model with the updated description.

setDesigns *Set the designs.*

Description

Set the designs.

Usage

```
setDesigns(object, designs)

## S4 method for signature 'Optimization'
setDesigns(object, designs)
```

Arguments

`object`	An object from the class Optimization.
`designs`	A list of objects from the class Design.

Value

The object with the new designs.

`setDistribution` *Set the distribution.*

Description

Set the distribution.

Usage

```
setDistribution(object, distribution)

## S4 method for signature 'ModelParameter'
setDistribution(object, distribution)
```

Arguments

`object`	An object from the class ModelParameter.
`distribution`	An object from the class Distribution.

Value

The model parameter with the updated distribution.

`setDose` *Set the amount of dose*

Description

Set the amount of dose

Usage

```
setDose(object, dose)

## S4 method for signature 'Administration'
setDose(object, dose)
```

Arguments

`object`	An object `Administration` from the class Administration.
`dose`	A numeric value of the amount of dose.

Value

The numeric `amount_dose` giving the new value of the amount of dose.

setEquation — *Set the equation of a model error.*

Description

Set the equation of a model error.

Usage

```
setEquation(object, equation)

## S4 method for signature 'ModelError'
setEquation(object, equation)
```

Arguments

`object`	An object from the class ModelError.
`equation`	An expression giving the equation of a model error.

Value

The model error with the updated equation.

setEquations — *Set the equations of a model.*

Description

Set the equations of a model.

Usage

```
setEquations(object, equations)

## S4 method for signature 'Model'
setEquations(object, equations)
```

Arguments

`object`	An object from the class Model.
`equations`	A list giving the equations of the model.

Value

The model with the updated equations.

setEquationsAfterInfusion

Set the equations after infusion.

Description

Set the equations after infusion.

Usage

```
setEquationsAfterInfusion(object, equations)

## S4 method for signature 'Model'
setEquationsAfterInfusion(object, equations)
```

Arguments

`object`	An object from the class Model.
`equations`	A list giving the equations after the infusion.

Value

The model with the updated equations after the infusion.

setEquationsDuringInfusion

Set the equations during infusion.

Description

Set the equations during infusion.

Usage

```
setEquationsDuringInfusion(object, equations)

## S4 method for signature 'Model'
setEquationsDuringInfusion(object, equations)
```

Arguments

`object`	An object from the class Model.
`equations`	A list giving the equations during the infusion.

Value

The model with the updated equations during the infusion.

setEvaluationFIMResults

Set the evaluation results.

Description

Set the evaluation results.

Usage

```
setEvaluationFIMResults(object, value)

## S4 method for signature 'Optimization'
setEvaluationFIMResults(object, value)
```

Arguments

object	An object from the class Optimization.
value	An object from the class Evaluation giving the evaluation results.

Value

The object with the updated object from the class Evaluation.

setEvaluationInitialDesignResults

Set the evaluation results of the initial design.

Description

Set the evaluation results of the initial design.

Usage

```
setEvaluationInitialDesignResults(object, value)

## S4 method for signature 'Optimization'
setEvaluationInitialDesignResults(object, value)
```

Arguments

object	An object from the class Optimization.
value	An object from the class Evaluation giving the evaluation results of the initial design.

Value

The object with the updated object from the class Evaluation.

---

setFim — *setFim*

Description

Set the fim of the design.

Usage

```
setFim(object, fim)

## S4 method for signature 'Design'
setFim(object, fim)
```

Arguments

`object`	An object `Design` from the class Design.
`fim`	An object `fim` from the class Fim.

Value

An object `Design` with the `fim` updated.

---

setFimTypeToString — *Convert the type of the object fim to a string.*

Description

Convert the type of the object fim to a string.

Usage

```
setFimTypeToString(object)

## S4 method for signature 'Fim'
setFimTypeToString(object)
```

Arguments

`object`	An object from the class Fim.

Value

The type of the object fim convert as a string.

`setFisherMatrix` *Set the FIM.*

Description

Set the FIM.

Usage

```
setFisherMatrix(object, value)

## S4 method for signature 'Fim'
setFisherMatrix(object, value)
```

Arguments

`object`	An object from the class Fim.
`value`	A matrix giving the FIM.

Value

The object from the class Fim with the FIM updated.

`setFixedEffects` *Set the fixed effects.*

Description

Set the fixed effects.

Usage

```
setFixedEffects(object)

## S4 method for signature 'Fim'
setFixedEffects(object)
```

Arguments

`object`	An object from the class Fim.

Value

Update the matrix of the fixed effects.

setFixedMu — *Set the mu as fixed or not.*

Description

Set the mu as fixed or not.

Usage

```
setFixedMu(object, value)

## S4 method for signature 'ModelParameter'
setFixedMu(object, value)
```

Arguments

`object`	An object from the class ModelParameter.
`value`	A Boolean if fixed or not.

Value

The mode parameter with the the mu updated as fixed or not.

setFixedOmega — *Set the omega as fixed of not.*

Description

Set the omega as fixed of not.

Usage

```
setFixedOmega(object, value)

## S4 method for signature 'ModelParameter'
setFixedOmega(object, value)
```

Arguments

`object`	An object from the class ModelParameter.
`value`	A Boolean fixed or not.

Value

The model parameter with the omega updated as fixed or not.

`setInitialConditions` *setInitialConditions*

Description

Set the initial conditions of a ode model.

Usage

```
setInitialConditions(object, initialConditions)

## S4 method for signature 'Arm'
setInitialConditions(object, initialConditions)

## S4 method for signature 'Model'
setInitialConditions(object, initialConditions)
```

Arguments

`object`	An object from the class Model.
`initialConditions`	A list giving the initial conditions.

Value

The model with the updated initial conditions.

`setIterationAndCriteria` *Set the iteration with the convergence criteria.*

Description

Set the iteration with the convergence criteria.

Usage

```
setIterationAndCriteria(object, value)

## S4 method for signature 'OptimizationAlgorithm'
setIterationAndCriteria(object, value)
```

Arguments

`object`	An object from the class OptimizationAlgorithm.
`value`	A dataframe giving the iteration with the convergence criteria.

Value

A dataframe giving the iteration with the convergence criteria.

---

setModel *Set the model.*

Description

Set the model.

Usage

```
setModel(object, model)

## S4 method for signature 'PFIMProject'
setModel(object, model)
```

Arguments

`object`	An object from the class PFIMProject.
`model`	An object from the class Model.

Value

The object with the updated model.

---

setModelError *Set the model error.*

Description

Set the model error.

Usage

```
setModelError(object, modelError)

## S4 method for signature 'Model'
setModelError(object, modelError)
```

Arguments

`object`	An object from the class Model.
`modelError`	An object from the class ModelError.

Value

The model with the updated model error.

setModelFromLibrary *Set a model from the library of model*

Description

Set a model from the library of model

Usage

```
setModelFromLibrary(object, modelFromLibrary)

## S4 method for signature 'Model'
setModelFromLibrary(object, modelFromLibrary)
```

Arguments

`object`	An object from the class Model.
`modelFromLibrary`	An object from the class Model.

Value

The model with the updated model from library of models.

setMu *Set the value of the fixed effect mu of an object.*

Description

Set the value of the fixed effect mu of an object.

Usage

```
setMu(object, value)

## S4 method for signature 'Distribution'
setMu(object, value)

## S4 method for signature 'ModelParameter'
setMu(object, value)
```

Arguments

`object`	An object defined form a class of PFIM.
`value`	The value of the fixed effect mu.

Value

The object with the updated fixed effect mu.

---

setName *Set the name of an object.*

Description

Set the name of an object.

Usage

```
setName(object, name)

## S4 method for signature 'Arm'
setName(object, name)

## S4 method for signature 'Design'
setName(object, name)

## S4 method for signature 'Model'
setName(object, name)
```

Arguments

`object`	An object defined form a class of PFIM.
`name`	A string giving the name of the object.

Value

The object with the updated name.

---

setNumberOfArms *setNumberOfArms*

Description

Set the number of arms in a design.

Usage

```
setNumberOfArms(object, numberOfArms)

## S4 method for signature 'Design'
setNumberOfArms(object, numberOfArms)
```

Arguments

`object`	An object `Design` from the class Design.
`numberOfArms`	A numeric `numberOfArms` giving the new number of arms in the design.

Value

An object `Design` with the `numberOfArms` updated.

`setOdeSolverParameters` *Set the parameters of the ode solver.*

Description

Set the parameters of the ode solver.

Usage

```
setOdeSolverParameters(object, odeSolverParameters)

## S4 method for signature 'Model'
setOdeSolverParameters(object, odeSolverParameters)
```

Arguments

`object`	An object from the class Model.
`odeSolverParameters`	A list giving the parameters of the ode solver.

Value

The model with the updated parameters of the ode solver.

`setOmega` *Set the matrix omega of an object.*

Description

Set the matrix omega of an object.

Usage

```
setOmega(object, value)

## S4 method for signature 'Distribution'
setOmega(object, value)

## S4 method for signature 'ModelParameter'
setOmega(object, value)
```

Arguments

`object`	An object defined form a class of PFIM.
`value`	The matrix omega.

Value

The object with the updated matrix omega.

`setOptimalDesign` *Set the optimal design.*

Description

Set the optimal design.

Usage

```
setOptimalDesign(object, optimalDesign)

## S4 method for signature 'OptimizationAlgorithm'
setOptimalDesign(object, optimalDesign)
```

Arguments

`object`	An object from the class OptimizationAlgorithm.
`optimalDesign`	An object from the class Design.

Value

The object with the updated optimal design.

`setOptimalWeights` *Set the optimal weights.*

Description

Set the optimal weights.

Usage

```
setOptimalWeights(object, optimalWeights)

## S4 method for signature 'MultiplicativeAlgorithm'
setOptimalWeights(object, optimalWeights)
```

Arguments

`object`	An object from the class MultiplicativeAlgorithm.
`optimalWeights`	A vector giving the optimal weights.

Value

The object with the updated optimal weights.

`setOptimizationResults` *Set the optimization results.*

Description

Set the optimization results.

Usage

```
setOptimizationResults(object, value)

## S4 method for signature 'Optimization'
setOptimizationResults(object, value)
```

Arguments

`object`	An object from the class Optimization.
`value`	An object from the class OptimizationAlgorithm giving the optimization results.

Value

The object with the updated object from the class OptimizationAlgorithm.

`setOutcome` *setOutcome*

Description

Set the outcome of an object.

Usage

```
setOutcome(object, outcome)

## S4 method for signature 'Administration'
setOutcome(object, outcome)

## S4 method for signature 'SamplingTimes'
setOutcome(object, outcome)
```

Arguments

`object`	An object defined form a class of PFIM.
`outcome`	A string defined the outcome.

Value

A string giving the updated outcome of the object.

`setOutcomes` *Set the outcomes of a model.*

Description

Set the outcomes of a model.

Usage

```
setOutcomes(object, outcomes)

## S4 method for signature 'Model'
setOutcomes(object, outcomes)
```

Arguments

`object`	An object from the class Model.
`outcomes`	A list giving the outcomes of the model.

Value

The model with the updated outcomes.

`setOutcomesEvaluation` *setOutcomesEvaluation*

Description

Set the results of the evaluation of the outcomes.

Usage

```
setOutcomesEvaluation(object, outcomesEvaluation)

## S4 method for signature 'Design'
setOutcomesEvaluation(object, outcomesEvaluation)
```

Arguments

`object`	An object `Design` from the class Design.
`outcomesEvaluation`	A list containing the evaluation of the outcomes.

Value

An object `Design` with the list `outcomesEvaluation` updated.

`setOutcomesForEvaluation` *Set the outcomes of a model used for the evaluation (is scales outcomes).*

Description

Set the outcomes of a model used for the evaluation (is scales outcomes).

Usage

```
setOutcomesForEvaluation(object, outcomes)

## S4 method for signature 'Model'
setOutcomesForEvaluation(object, outcomes)
```

Arguments

`object`	An object from the class Model.
`outcomes`	A list giving the outcomes of a model used for the evaluation (is scales outcomes).

Value

The model with the updated outcomes for the evaluation.

`setOutcomesGradient` *setOutcomesGradient*

Description

Set the results of the evaluation of the outcomes.

Usage

```
setOutcomesGradient(object, outcomesGradient)

## S4 method for signature 'Design'
setOutcomesGradient(object, outcomesGradient)
```

Arguments

`object`	An object `Design` from the class Design.
`outcomesGradient`	A list containing the evaluation of the outcome gradients.

Value

An object `Design` with the list `outcomesGradient` updated.

`setParameters` *Set the parameters of an object.*

Description

Set the parameters of an object.

Usage

```
setParameters(object, parameters)

## S4 method for signature 'Distribution'
setParameters(object, parameters)

## S4 method for signature 'Model'
setParameters(object, parameters)

## S4 method for signature 'FedorovWynnAlgorithm'
setParameters(object, parameters)

## S4 method for signature 'MultiplicativeAlgorithm'
setParameters(object, parameters)

## S4 method for signature 'PGBOAlgorithm'
setParameters(object, parameters)

## S4 method for signature 'PSOAlgorithm'
setParameters(object, parameters)

## S4 method for signature 'SimplexAlgorithm'
setParameters(object, parameters)
```

Arguments

`object`	An object defined form a class of PFIM.
`parameters`	A list of parameters.

Value

The object with the updated list of parameters.

`setSamplingConstraintForOptimization` *setSamplingConstraintForOptimization*

Description

Set the sampling times constraint for optimization with PSO, PGBO and Simplex

Usage

```
setSamplingConstraintForOptimization(object)

## S4 method for signature 'Design'
setSamplingConstraintForOptimization(object)
```

Arguments

`object`	An object from the class Design.

Value

The arms with the sampling times constraints.

`setSamplings` *Set the sampling times.*

Description

Set the sampling times.

Usage

```
setSamplings(object, samplings)

## S4 method for signature 'SamplingTimes'
setSamplings(object, samplings)
```

Arguments

`object`	An object from the class SamplingTimes.
`samplings`	A vector giving the sampling times.

Value

The updated sampling times.

`setSamplingTime` *setSamplingTime*

Description

Set the sampling time of an arm.

Usage

```
setSamplingTime(object, samplingTime)

## S4 method for signature 'Arm'
setSamplingTime(object, samplingTime)
```

Arguments

`object`	An object `Arm` from the class Arm.
`samplingTime`	An object `samplingTime` from the class SamplingTimes.

Value

An object `Arm` from the class Arm with the new sampling time `samplingTime`.

`setSamplingTimes` *setSamplingTimes*

Description

Set the vectors of sampling times for an arm.

Usage

```
setSamplingTimes(object, samplingTimes)

## S4 method for signature 'Arm'
setSamplingTimes(object, samplingTimes)
```

Arguments

`object`	An object `Arm` from the class Arm.
`samplingTimes`	The list containing the new sampling times.

Value

An object `Arm` from the class Arm with the new sampling times `samplingTimes`.

`setSamplingTimesConstraints`
setSamplingTimesConstraints

Description

Set the sampling times constraints.

Usage

```
setSamplingTimesConstraints(object, samplingTimesConstraints)

## S4 method for signature 'Arm'
setSamplingTimesConstraints(object, samplingTimesConstraints)
```

Arguments

`object`	An object `Arm` from the class Arm.
`samplingTimesConstraints`	An object `SamplingTimeConstraints` from the class SamplingTimeConstraints.

Value

The arm with the new sampling time constraints.

`setShrinkage` *Set the shrinkage.*

Description

Set the shrinkage.

Usage

```
setShrinkage(object, value)

## S4 method for signature 'BayesianFim'
setShrinkage(object, value)

## S4 method for signature 'IndividualFim'
setShrinkage(object, value)

## S4 method for signature 'PopulationFim'
setShrinkage(object, value)
```

Arguments

`object`	An object from the class Fim.
`value`	A vector giving the shrinkage of the Bayesian fim.

Value

The object with the updated shrinkage.

`setSigmaInter` *Set the parameter sigma inter.*

Description

Set the parameter sigma inter.

Usage

```
setSigmaInter(object, sigmaInter)

## S4 method for signature 'ModelError'
setSigmaInter(object, sigmaInter)
```

Arguments

`object`	An object from the class ModelError.
`sigmaInter`	A numeric giving the parameter sigma inter.

Value

The model error with the updated sigma inter.

`setSigmaSlope` *Set the parameter sigma slope.*

Description

Set the parameter sigma slope.

Usage

```
setSigmaSlope(object, sigmaSlope)

## S4 method for signature 'ModelError'
setSigmaSlope(object, sigmaSlope)
```

Arguments

`object`	An object from the class ModelError.
`sigmaSlope`	A numeric giving the parameter sigma slope.

Value

The model error with the updated sigma slope.

setSize *setSize*

Description

Set the size of an object.

Set the size of an arm.

Usage

```
setSize(object, size)

setSize(object, size)

## S4 method for signature 'Arm'
setSize(object, size)

## S4 method for signature 'Design'
setSize(object, size)
```

Arguments

`object`	An object `Arm` from the class Arm.
`size`	A numeric giving the new size of the object `Arm`.

Value

The object with its size updated.

The object `Arm` object with its new size.

setTau *setTau*

Description

Set the frequency `tau`.

Usage

```
setTau(object, tau)

## S4 method for signature 'Administration'
setTau(object, tau)
```

Arguments

`object`	An object `Administration` from the class Administration.
`tau`	A numeric value for the infusion lag tau.

Value

The object `Administration` object with its new value of the infusion lag tau.

`setTimeDose` *setTimeDose*

Description

Set the times vector when doses are given.

Usage

```
setTimeDose(object, timeDose)

## S4 method for signature 'Administration'
setTimeDose(object, timeDose)
```

Arguments

`object`	An object `Administration` from the class Administration.
`timeDose`	A numeric value of the time dose.

Value

The object `Administration` with its new times vector for doses.

`setTinf` *Set the infusion duration.*

Description

Set the infusion duration.

Usage

```
setTinf(object, Tinf)

## S4 method for signature 'Administration'
setTinf(object, Tinf)
```

Arguments

`object`	An object `Administration` from the class Administration.
`Tinf`	A numeric value for the infusion duration Tinf.

Value

The object `Administration` with its new value of the infusion duration Tinf.

`setVarianceEffects` *Set the matrix of the variance effects.*

Description

Set the matrix of the variance effects.

Usage

```
setVarianceEffects(object)

## S4 method for signature 'Fim'
setVarianceEffects(object)
```

Arguments

`object`	An object from the class Fim.

Value

Update the matrix of the variance effects.

`show,Design-method` *show*

Description

show

show

show

show

show

show

show

show

Usage

```
## S4 method for signature 'Design'
show(object)

## S4 method for signature 'Evaluation'
show(object)

## S4 method for signature 'FedorovWynnAlgorithm'
show(object)

## S4 method for signature 'MultiplicativeAlgorithm'
show(object)

## S4 method for signature 'Optimization'
show(object)

## S4 method for signature 'PGBOAlgorithm'
show(object)

## S4 method for signature 'PSOAlgorithm'
show(object)

## S4 method for signature 'SimplexAlgorithm'
show(object)
```

Arguments

`object`	object

`SimplexAlgorithm-class` *Class "SimplexAlgorithm"*

Description

Class "SimplexAlgorithm" implements the Multiplicative algorithm.

Objects from the class `SimplexAlgorithm`

Objects form the class `SimplexAlgorithm` can be created by calls of the form `SimplexAlgorithm(...)` where (...) are the parameters for the `SimplexAlgorithm` objects.

Slots for `SamplingTimes` objects

`pctInitialSimplexBuilding`**:** A numeric giving the percentage of the initial simplex.

`maxIteration`**:** A numeric giving the number of maximum iteration.

`tolerance`**:** A numeric giving the tolerance threshold.

`showProcess`**:** A boolean to show or not the process.

`optimalDesign`**:** A `Design` object giving the optimal design.

`iterationAndCriteria`**:** A list giving the optimal criteria at each iteration.

Index