

pyfuzzy

API Documentation

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1 Package fuzzy

Initialize the fuzzy module.

(GRAPH)

1.1 Modules

- **Adjective**: Describes a ...
(Section 2, p. 19)
- **AdjectiveProxy**: Serves as proxy for a named variable.adjective.
(Section 3, p. 21)
- **Exception**: Base class for any kind of exceptions used by this package.
(Section 4, p. 23)
- **InputVariable**: General instance of an input variable.
(Section 5, p. 25)
- **OutputVariable**: General instance of an output variable.
(Section 6, p. 27)
- **Rule**: Represents a fuzzy rule.
(Section 7, p. 29)
- **System**: Main coordinator class of a whole fuzzy system
(Section 8, p. 31)
- **Variable**: Base class for any kind of fuzzy variable.
(Section 9, p. 33)
- **complement**: Complement functions.
(Section 10, p. 35)
 - **Base**: Base class for all complement methods
(Section 11, p. 36)
 - **Parametric**: Abstract base class for any parametric fuzzy complement
(Section 12, p. 39)
 - **Sugeno**: Complement after Sugeno
(Section 13, p. 41)
 - **Yager**: Complement after Yager
(Section 14, p. 43)
 - **Zadeh**: Complement after Zadeh
(Section 15, p. 45)
- **defuzzify**: Defuzzification functions.
(Section 16, p. 47)
 - **Base** (Section 17, p. 48)
 - **COG** (Section 18, p. 51)
 - **COGS** (Section 19, p. 53)
 - **Dict** (Section 20, p. 55)
 - **LM** (Section 21, p. 57)
 - **MaxLeft** (Section 22, p. 59)
 - **MaxRight** (Section 23, p. 61)
 - **RM** (Section 24, p. 63)
- **doc**: Helpers to generate documentation of a fuzzy system
(Section 25, p. 65)
 - **plot**: Generate documentation by plotting some parts of the system
(Section 26, p. 66)

- * **gnuplot**: Documentation
(Section 27, p. 67)
 - **doc**: Plotting of variables, adjectives, ...
(Section 28, p. 68)
 - **structure**: Generate documentation of structure of system
(Section 29, p. 74)
 - * **dot**: Documentation
(Section 30, p. 75)
 - **dot**: Generates description of structure in dot format
(Section 31, p. 76)
 - **handlers**: Handlers for different object types which print the object in dot format
(Section 32, p. 77)
- **fuzzify**: Fuzzyfication functions.
(Section 33, p. 86)
 - **Base** (Section 34, p. 87)
 - **Dict** (Section 35, p. 88)
 - **Plain** (Section 36, p. 90)
- **norm**: This package contains all realized fuzzy norms.
(Section 37, p. 91)
 - **AlgebraicProdSum** (Section 38, p. 93)
 - **AlgebraicProduct** (Section 39, p. 95)
 - **AlgebraicSum** (Section 40, p. 97)
 - **ArithmeticMean** (Section 41, p. 99)
 - **BoundedDifference** (Section 42, p. 101)
 - **BoundedSum** (Section 43, p. 103)
 - **DombiIntersection** (Section 44, p. 105)
 - **DombiUnion** (Section 45, p. 107)
 - **DrasticProduct** (Section 46, p. 109)
 - **DrasticSum** (Section 47, p. 111)
 - **DualOfGeometricMean** (Section 48, p. 113)
 - **DualOfHarmonicMean** (Section 49, p. 115)
 - **DubiosPradeIntersection** (Section 50, p. 117)
 - **DubiosPradeUnion** (Section 51, p. 119)
 - **EinsteinProduct** (Section 52, p. 121)
 - **EinsteinSum** (Section 53, p. 123)
 - **FrankIntersection** (Section 54, p. 125)
 - **FrankUnion** (Section 55, p. 127)
 - **FuzzyAnd** (Section 56, p. 129)
 - **FuzzyOr** (Section 57, p. 131)
 - **GammaOperator** (Section 58, p. 133)
 - **GeometricMean** (Section 59, p. 135)
 - **HamacherIntersection** (Section 60, p. 137)
 - **HamacherProduct** (Section 61, p. 139)
 - **HamacherSum** (Section 62, p. 141)
 - **HamacherUnion** (Section 63, p. 143)
 - **HarmonicMean** (Section 64, p. 145)
 - **Max** (Section 65, p. 147)
 - **Min** (Section 66, p. 149)
 - **MinMax** (Section 67, p. 151)
 - **Norm**: Abstract base class for any kind of fuzzy norm.
(Section 68, p. 153)

- **ParametricNorm**: Base class for any kind of parametric fuzzy norm.
(Section 69, p. 157)
- **SchweizerIntersection** (Section 70, p. 159)
- **SchweizerIntersection2** (Section 71, p. 161)
- **SchweizerIntersection3** (Section 72, p. 163)
- **SchweizerUnion** (Section 73, p. 165)
- **SchweizerUnion2** (Section 74, p. 167)
- **SchweizerUnion3** (Section 75, p. 169)
- **YagerIntersection** (Section 76, p. 171)
- **YagerUnion** (Section 77, p. 173)
- **operator**: These operators are used to build fuzzy rules.
(Section 78, p. 175)
 - **Compound**: The Compound class takes values of several input operators and processes them through a given norm.
(Section 79, p. 177)
 - **Const**: Special operator class which returns a constant value.
(Section 80, p. 179)
 - **Input**: Special operator class which gets its value from a fuzzy adjective.
(Section 81, p. 181)
 - **Not**: Operator class which takes value of input operator and calculates complement of it.
(Section 82, p. 183)
 - **Operator**: Calculate value for fuzzy rule.
(Section 83, p. 185)
- **set**: Different kind of fuzzy sets.
(Section 84, p. 187)
 - **Function** (Section 85, p. 188)
 - **PiFunction** (Section 86, p. 189)
 - **Polygon** (Section 87, p. 192)
 - **SFunction** (Section 88, p. 195)
 - **Set**: Base class for all fuzzy sets.
(Section 89, p. 198)
 - **Singleton** (Section 90, p. 200)
 - **Trapez** (Section 91, p. 203)
 - **Triangle** (Section 92, p. 206)
 - **ZFunction** (Section 93, p. 209)
 - **operations**: Helper functions for calculation with fuzzy sets.
(Section 94, p. 212)
- **storage**: Storage functions.
(Section 95, p. 216)
 - **fcl**: Reading and writing FCL files.
(Section 96, p. 217)
 - * **FCLLexer**: Lexer for reading FCL by the pyfuzzy package.
(Section 97, p. 218)
 - * **FCLParser**: Parser for reading FCL by the pyfuzzy package.
(Section 98, p. 225)
 - * **Reader** (Section 99, p. 239)
- **utils**: Helper functions for pyfuzzy.
(Section 100, p. 240)

1.2 Variables

Name	Description
__revision__	Value: '\$Id: __init__.py,v 1.6 2009/10/07 21:08:12 rliebscher Ex...

2 Module fuzzy.Adjective

Describes a ... of a variable.

2.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: Adjective.py,v 1.13 2009/10/07 21:08:12 rliebscher ...

2.2 Class Adjective

object  **fuzzy.Adjective.Adjective**

Describes a ... of a variable.

2.2.1 Methods

<code>__init__(self, set=Set(), COM=None)</code> Initialize adjective. Parameters set: fuzzy set (<i>type=fuzzy.set.Set.Set</i>) COM: norm (if None the class default _COM is used.) (<i>type=fuzzy.norm.Norm.Norm</i>) Overrides: object.__init__
<code>setMembershipForValue(self, value)</code> Get membership for an input value from the fuzzy set.
<code>getMembership(self)</code> Return membership set in this adjective.
<code>setMembership(self, value)</code> Set membership of this adjective as result of a rule calculation, if already set use COM norm to merge old and new value.
<code>reset(self)</code> Reset membership to unknown value (None).

getName (<i>self</i> , <i>system</i>)
--

Find own name in given system. Returns a tuple (var_name,adj_name) of None.

Inherited from object

`--delattr--()`, `--getattr--()`, `--hash--()`, `--new--()`, `--reduce--()`, `--reduce_ex--()`,
`--repr--()`, `--setattr--()`, `--str--()`

2.2.2 Properties

Name	Description
<i>Inherited from object</i>	
<code>--class--</code>	

2.2.3 Instance Variables

Name	Description
COM	norm (if None the class default _COM is used.) (<i>type=fuzzy.norm.Norm.Norm</i>)
membership	set or calculated membership (<i>type=float</i>)
set	fuzzy set (<i>type=fuzzy.set.Set.Set</i>)

3 Module **fuzzy.AdjectiveProxy**

Serves as proxy for a named variable.adjective.

3.1 Variables

Name	Description
<code>--revision--</code>	Value: '\$Id: AdjectiveProxy.py,v 1.10 2009/10/07 21:08:13 rliebs...

3.2 Class **AdjectiveProxy**

object └─ **fuzzy.AdjectiveProxy.AdjectiveProxy**

Serves as proxy for the named variable.adjective in system.

Deprecated: such objects have problems using pickle

3.2.1 Methods

`--init--`(*self, system, variable, adjective*)
`x.__init__(...)` initializes x; see `x.__class__.__doc__` for signature
 Overrides: `object.__init__` extit(inherited documentation)

`--getattr--`(*self, name*)
 Return attribute value from real adjective.

`--setattr--`(*self, name, value*)
 Set attribute value in real adjective.
 Overrides: `object.__setattr__`

`getName`(*self, system*)
 Find own name in given system. Returns a tuple (`var_name`,`adj_name`) of
 None.

Inherited from object

`__delattr__()`, `__getattr__()`, `__hash__()`, `__new__()`, `__reduce__()`, `__reduce_ex__()`,
`__repr__()`, `__str__()`

3.2.2 Properties

Name	Description
<i>Inherited from object</i>	
<code>__class__</code>	

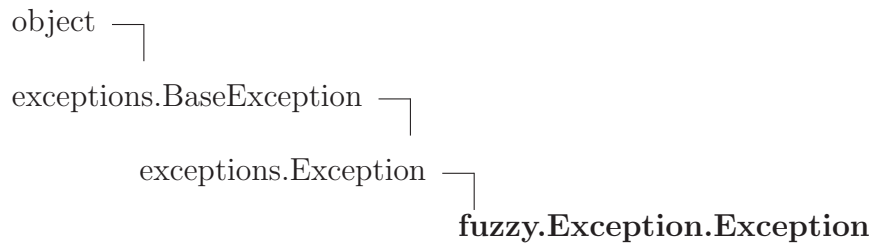
4 Module fuzzy.Exception

Base class for any kind of exceptions used by this package.

4.1 Variables

Name	Description
<code>--revision--</code>	Value: '\$Id: Exception.py,v 1.5 2009/10/07 21:08:12 rliebscher E...

4.2 Class Exception



Known Subclasses: `fuzzy.complement.Base.ComplementException`, `fuzzy.norm.Norm.NormException`, `fuzzy.defuzzify.Base.DefuzzificationException`

Base class for any kind of exceptions used by this package.

4.2.1 Methods

Inherited from `exceptions.Exception`

`--init--()`, `--new--()`

Inherited from `exceptions.BaseException`

`--delattr--()`, `--getattr--()`, `--getitem--()`, `--getslice--()`, `--reduce--()`, `--repr--()`,
`--setattr--()`, `--setstate--()`, `--str--()`

Inherited from `object`

`--hash--()`, `--reduce_ex--()`

4.2.2 Properties

Name	Description
	<i>Inherited from exceptions.BaseException</i>
	args, message
	<i>Inherited from object</i>
	<code>__class__</code>

5 Module *fuzzy.InputVariable*

General instance of an input variable.

5.1 Variables

Name	Description
<code>--revision--</code>	Value: '\$Id: InputVariable.py,v 1.6 2009/10/07 21:08:13 rliebsch...

5.2 Class *InputVariable*



General instance of an input variable The fuzzification is provided by special object for this purpose, set as fuzzify param. Also marker, so you can check if any variable is an (instance of) input variable

5.2.1 Methods

```
__init__(self, fuzzify=None, *args, **keywords)
```

Initialize this input variable with a fuzzification method.

Parameters

fuzzify: Fuzzification method.

(*type=fuzzy.fuzzify.Base.Base*)

Overrides: `object.__init__`

```
setValue(self, value)
```

Let adjectives calculate their membership values.

Overrides: `fuzzy.Variable.Variable.setValue`

Inherited from `fuzzy.Variable.Variable`(Section 9.2)

`getName()`, `getValue()`, `reset()`

Inherited from object

`__delattr__()`, `__getattr__()`, `__hash__()`, `__new__()`, `__reduce__()`, `__reduce_ex__()`,
`__repr__()`, `__setattr__()`, `__str__()`

5.2.2 Properties

Name	Description
<i>Inherited from object</i>	
<code>__class__</code>	

5.2.3 Instance Variables

Name	Description
<code>fuzzify</code>	Fuzzification method. (<i>type=fuzzy.fuzzify.Base.Base</i>)
<i>Inherited from fuzzy.Variable.Variable (Section 9.2)</i>	
<code>description</code> , <code>max</code> , <code>min</code> , <code>unit</code>	

6 Module *fuzzy.OutputVariable*

General instance of an output variable.

6.1 Variables

Name	Description
<code>--revision--</code>	Value: '\$Id: OutputVariable.py,v 1.10 2009/10/07 21:08:12 rliebs...

6.2 Class *OutputVariable*

object └

fuzzy.Variable.Variable └

fuzzy.OutputVariable.OutputVariable

General instance of an output variable. The defuzzification is provided by special object for this purpose, set as defuzzify param. Also marker, so you can check if any variable is an (instance of) output variable

6.2.1 Methods

<code>--init--(self, defuzzify=None, *args, **keywords)</code>
Initialize this output variable with a defuzzification method.
Parameters
defuzzify: Defuzzification method.
(<i>type=fuzzy.defuzzify.Base.Base</i>)
Overrides: object.__init__

<code>getValue(self)</code>
defuzzification
Overrides: fuzzy.Variable.Variable.getValue

Inherited from fuzzy.Variable.Variable(Section 9.2)

getName(), reset(), setValue()

Inherited from object

`__delattr__()`, `__getattr__()`, `__hash__()`, `__new__()`, `__reduce__()`, `__reduce_ex__()`,
`__repr__()`, `__setattr__()`, `__str__()`

6.2.2 Properties

Name	Description
<i>Inherited from object</i>	
<code>__class__</code>	

6.2.3 Instance Variables

Name	Description
<code>defuzzify</code>	Defuzzification method. (<i>type=fuzzy.defuzzify.Base.Base</i>)
<i>Inherited from fuzzy.Variable.Variable (Section 9.2)</i>	
<code>description</code> , <code>max</code> , <code>min</code> , <code>unit</code>	

7 Module fuzzy.Rule

Represents a fuzzy rule.

7.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: Rule.py,v 1.13 2009/10/07 21:08:13 rliebscher Exp \$'

7.2 Class Rule

object —
fuzzy.Rule.Rule

This realizes an important part of the inference engine. It represents and calculates the value of a fuzzy rule and sets the given adjective to the appropriate value.

7.2.1 Methods

<code>__init__(self, adjective, operator, certainty=1.0, CER=None)</code>
Initialize instance.
Parameters
adjective: fuzzy adjective to set (<i>type=fuzzy.Adjective.Adjective</i>)
operator: Operator which provides the value to set (<i>type=fuzzy.operator.Operator.Operator</i>)
certainty: how sure are we about this rule (<i>type=float</i>)
CER: fuzzy norm to use with certainty (normally a t-norm) (<i>type=fuzzy.norm.Norm.Norm</i>)
Overrides: object.__init__
<code>compute(self)</code>
Compute and set value for given fuzzy adjective.

getName (<i>self</i> , <i>system</i>)
--

Lookup the name given this rule in the given system

Inherited from object

`--delattr--()`, `--getattr--()`, `--hash--()`, `--new--()`, `--reduce--()`, `--reduce.ex--()`,
`--repr--()`, `--setattr--()`, `--str--()`

7.2.2 Properties

Name	Description
<i>Inherited from object</i>	
<code>--class--</code>	

7.2.3 Instance Variables

Name	Description
CER	fuzzy norm to use with certainty (normally a t-norm) (<i>type=fuzzy.norm.Norm.Norm</i>)
adjective	fuzzy adjective to set (<i>type=fuzzy.Adjective.Adjective</i>)
certainty	how sure are we about this rule (<i>type=float</i>)
operator	Operator which provides the value to set (<i>type=fuzzy.operator.Operator.Operator</i>)

8 Module fuzzy.System

Main coordinator class of a whole fuzzy system

8.1 Variables

Name	Description
<code>--revision--</code>	Value: '\$Id: System.py,v 1.16 2009/10/07 21:08:13 rliebscher Exp \$'

8.2 Class System

object └─
 fuzzy.System.System

Holds all stuff together. (variables, rules, ...) Provides methods to do calculation with it.

8.2.1 Methods

<code>--init--(self, description='')</code> Constructor. Parameters description: description (<i>type=string</i>) Overrides: object.__init__
<code>reset(self)</code> Reset all memberships for the next run of calculate
<code>fuzzify(self, input)</code> Fuzzify the inputs. The input dictionary contains the input values for the named variables.
<code>inference(self)</code> Calculate the fuzzy inference given by the rules.

defuzzify (<i>self</i> , <i>output</i>)
--

Defuzzify the variables. The output dictionary serves as container and provides the names of the variables to read.

calculate (<i>self</i> , <i>input</i> , <i>output</i>)

Do a complete fuzzy calculation step. The input dictionary contains the input values for the named variables. The output dictionary serves as container and provides the names of the variables to read.
--

findVariableName (<i>self</i> , <i>var</i>)
--

Find name of variable in this system

findAdjectiveName (<i>self</i> , <i>adj</i>)

Find name of adjective (and variable) in this system
--

findRuleName (<i>self</i> , <i>_rule</i>)
--

Find name of rule in this system

Inherited from object

`__delattr__()`, `__getattr__()`, `__hash__()`, `__new__()`, `__reduce__()`, `__reduce_ex__()`, `__repr__()`, `__setattr__()`, `__str__()`

8.2.2 Properties

Name	Description
<i>Inherited from object</i>	
<code>__class__</code>	

8.2.3 Instance Variables

Name	Description
description	description (<i>type</i> =string)
rules	dictionary to hold all rules. (<i>type</i> = <code>{string:fuzzy.Rule.Rule}</code>)
variables	dictionary to hold all variables. (<i>type</i> = <code>{string:fuzzy.Variable.Variable}</code>)

9 Module fuzzy.Variable

Base class for any kind of fuzzy variable.

9.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: Variable.py,v 1.13 2009/10/07 21:08:13 rliebscher E...

9.2 Class Variable



Known Subclasses: `fuzzy.OutputVariable.OutputVariable`, `fuzzy.InputVariable.InputVariable`

Base class for any kind of fuzzy variable. Returns as output the previous input value.

9.2.1 Methods

```
__init__(self, description='', min=0.0, max=1.0, unit='')
```

`x.__init__(...)` initializes `x`; see `x.__class__.__doc__` for signature

Parameters

description: Description of the fuzzy variable

(type=string)

min: minimum value (not strictly enforced, but useful for some external tools)

(type=float)

max: maximum value (not strictly enforced, but useful for some external tools)

(type=float)

unit: Unit of the values

(type=string)

Overrides: `object.__init__`

setValue (<i>self</i> , <i>value</i>)
--

Just store the value.

getValue (<i>self</i>)

Return previous input value.

reset (<i>self</i>)

Reset meberships of adjectives for new calculation step.
--

getName (<i>self</i> , <i>system</i>)
--

Lookup the name given this variable in the given system

Inherited from object

`__delattr__()`, `__getattr__()`, `__hash__()`, `__new__()`, `__reduce__()`, `__reduce_ex__()`,
`__repr__()`, `__setattr__()`, `__str__()`

9.2.2 Properties

Name	Description
<i>Inherited from object</i>	
<code>__class__</code>	

9.2.3 Instance Variables

Name	Description
description	Description of the fuzzy variable (<i>type=string</i>)
max	maximum value (not strictly enforced, but useful for some external tools) (<i>type=float</i>)
min	minimum value (not strictly enforced, but useful for some external tools) (<i>type=float</i>)
unit	Unit of the values (<i>type=string</i>)

10 Package fuzzy.complement

Complement functions.

10.1 Modules

- **Base:** Base class for all complement methods
(Section 11, p. 36)
- **Parametric:** Abstract base class for any parametric fuzzy complement
(Section 12, p. 39)
- **Sugeno:** Complement after Sugeno
(Section 13, p. 41)
- **Yager:** Complement after Yager
(Section 14, p. 43)
- **Zadeh:** Complement after Zadeh
(Section 15, p. 45)

10.2 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: __init__.py,v 1.1 2009/08/31 21:02:06 rliebscher Ex...

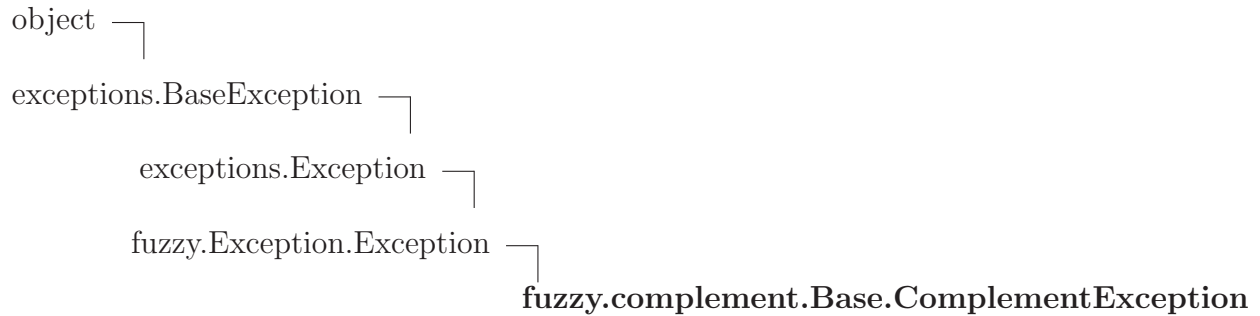
11 Module `fuzzy.complement.Base`

Base class for all complement methods

11.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: Base.py,v 1.2 2009/10/07 21:08:14 rliebscher Exp \$'

11.2 Class `ComplementException`



An own exception type for complements.

11.2.1 Methods

Inherited from `exceptions.Exception`

`__init__()`, `__new__()`

Inherited from `exceptions.BaseException`

`__delattr__()`, `__getattr__()`, `__getitem__()`, `__getslice__()`, `__reduce__()`, `__repr__()`,
`__setattr__()`, `__setstate__()`, `__str__()`

Inherited from `object`

`__hash__()`, `__reduce_ex__()`

11.2.2 Properties

Name	Description
<i>Inherited from exceptions.BaseException</i>	
args, message	
<i>Inherited from object</i>	
__class__	

11.3 Class Base



Known Subclasses: fuzzy.complement.Zadeh.Zadeh, fuzzy.complement.Parametric.Parametric
 Base class for all complement methods

11.3.1 Methods

__init__ (<i>self</i> , *args, **keywords)
Initialize the complement instance Overrides: object.__init__
__call__ (<i>self</i> , value)
Calculate the complement of the value. Parameters value: the value to complement (<i>type=float</i>) Return Value the complemented value (<i>type=float</i>)

Inherited from object

__delattr__(), __getattr__(), __hash__(), __new__(), __reduce__(), __reduce_ex__(),
 __repr__(), __setattr__(), __str__()

11.3.2 Properties

Name	Description
<i>Inherited from object</i> __class__	

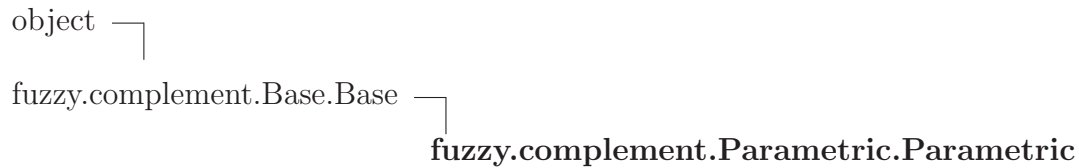
12 Module *fuzzy.complement.Parametric*

Abstract base class for any parametric fuzzy complement

12.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: Parametric.py,v 1.2 2009/10/07 21:08:14 rliebscher ...

12.2 Class *Parametric*



Known Subclasses: *fuzzy.complement.Yager.Yager*, *fuzzy.complement.Sugeno.Sugeno*

Abstract base class for any parametric fuzzy complement

12.2.1 Methods

<code>__init__</code> (<i>self</i> , <i>p</i> , <i>*args</i> , <i>**keywords</i>)
Initialize type and parameter
Parameters
<i>p</i> : parameter for complement (<i>type=</i> <i>float</i>)
Overrides: <i>object.__init__</i>

*Inherited from *fuzzy.complement.Base.Base* (Section 11.3)*

`__call__`()

*Inherited from *object**

`__delattr__`(), `__getattr__`(), `__hash__`(), `__new__`(), `__reduce__`(), `__reduce_ex__`(),
`__repr__`(), `__setattr__`(), `__str__`()

12.2.2 Properties

Name	Description
p_range	range(s) of valid values for p
<i>Inherited from object</i>	
__class__	

12.2.3 Instance Variables

Name	Description
p	x (<i>type=float</i>)

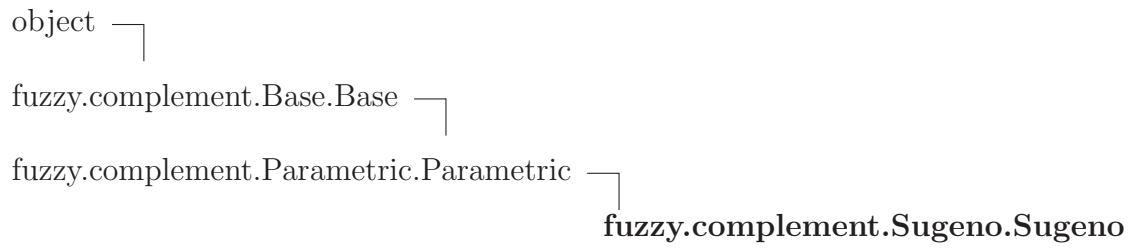
13 Module fuzzy.complement.Sugeno

Complement after Sugeno

13.1 Variables

Name	Description
<code>--revision--</code>	Value: '\$Id: Sugeno.py,v 1.3 2009/10/07 21:08:14 rliebscher Exp \$'

13.2 Class Sugeno



Complement after Sugeno

13.2.1 Methods

<code>--init--(self, lambda_=0.0, *args, **keywords)</code>
Initialize instance with given parameter
Parameters
<code>lambda_</code> : The parameter (<i>type=float</i>)
Overrides: <code>object.__init__</code>

```
--call--(self, value)
```

calculate the complement of the value

Parameters

value: the value to complement
(*type=float*)

Return Value

the complemented value
(*type=float*)

Overrides: fuzzy.complement.Base.Base.--call--

Inherited from object

--delattr--(), --getattribute--(), --hash--(), --new--(), --reduce--(), --reduce_ex--(),
--repr--(), --setattr--(), --str--()

13.2.2 Properties

Name	Description
<i>Inherited from fuzzy.complement.Parametric.Parametric (Section 12.2)</i>	
p_range	
<i>Inherited from object</i>	
--class--	

13.2.3 Instance Variables

Name	Description
<i>Inherited from fuzzy.complement.Parametric.Parametric (Section 12.2)</i>	
p	

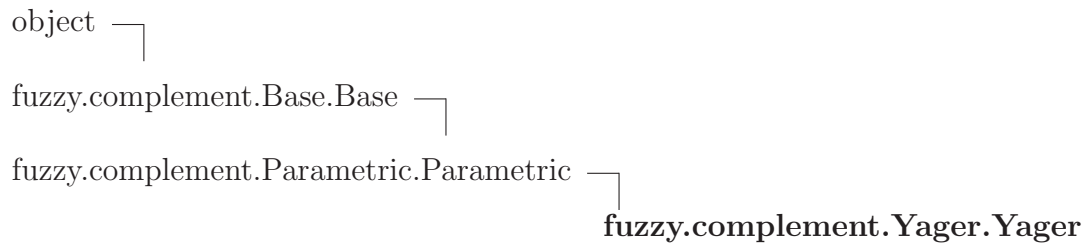
14 Module *fuzzy.complement.Yager*

Complement after Yager

14.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: Yager.py,v 1.3 2009/10/07 21:08:14 rliebscher Exp \$'

14.2 Class Yager



Complement after Yager

14.2.1 Methods

<code>__init__</code> (<i>self</i> , <i>omega</i> =1.0, * <i>args</i> , ** <i>keywords</i>)
Initialize instance with given parameter
Parameters
<i>omega</i> : The parameter (<i>type</i> =float)
Overrides: <code>object.__init__</code>

__call__(self, value)

calculate the complement of the value

Parameters

value: the value to complement
(type=float)

Return Value

the complemented value
(type=float)

Overrides: fuzzy.complement.Base.Base.__call__

Inherited from object

`__delattr__()`, `__getattr__()`, `__hash__()`, `__new__()`, `__reduce__()`, `__reduce_ex__()`,
`__repr__()`, `__setattr__()`, `__str__()`

14.2.2 Properties

Name	Description
<i>Inherited from fuzzy.complement.Parametric.Parametric (Section 12.2)</i>	
<code>p_range</code>	
<i>Inherited from object</i>	
<code>__class__</code>	

14.2.3 Instance Variables

Name	Description
<i>Inherited from fuzzy.complement.Parametric.Parametric (Section 12.2)</i>	
<code>p</code>	

15 Module fuzzy.complement.Zadeh

Complement after Zadeh

15.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: Zadeh.py,v 1.2 2009/10/07 21:08:14 rliebscher Exp \$'

15.2 Class Zadeh



Complement after Zadeh

15.2.1 Methods

<code>__init__</code> (<i>self</i> , * <i>args</i> , ** <i>keywords</i>)
Initialize the complement instance Overrides: <code>object.__init__</code>
<code>__call__</code> (<i>self</i> , <i>value</i>)
calculate the complement of the value
Parameters
<i>value</i> : the value to complement (<i>type=</i> <code>float</code>)
Return Value
the complemented value (<i>type=</i> <code>float</code>)
Overrides: <code>fuzzy.complement.Base.Base.__call__</code>

Inherited from object

`--delattr--()`, `--getattr__()`, `--hash--()`, `--new--()`, `--reduce--()`, `--reduce_ex--()`,
`--repr--()`, `--setattr--()`, `--str--()`

15.2.2 Properties

Name	Description
<i>Inherited from object</i>	
<code>--class--</code>	

16 Package fuzzy.defuzzify

Defuzzification functions.

16.1 Modules

- **Base** (*Section 17, p. 48*)
- **COG** (*Section 18, p. 51*)
- **COGS** (*Section 19, p. 53*)
- **Dict** (*Section 20, p. 55*)
- **LM** (*Section 21, p. 57*)
- **MaxLeft** (*Section 22, p. 59*)
- **MaxRight** (*Section 23, p. 61*)
- **RM** (*Section 24, p. 63*)

16.2 Variables

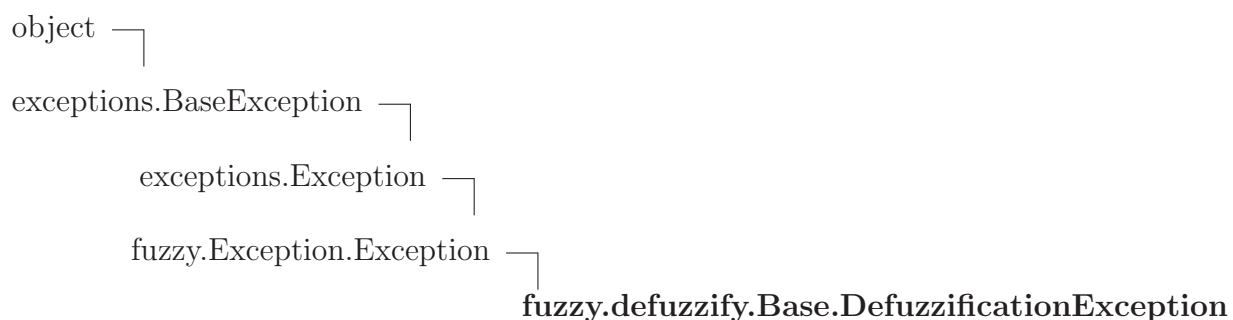
Name	Description
<code>__revision__</code>	Value: '\$Id: __init__.py,v 1.2 2009/08/07 07:19:18 rliebscher Ex...

17 Module fuzzy.defuzzify.Base

17.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: Base.py,v 1.7 2009/08/07 07:19:18 rliebscher Exp \$'

17.2 Class DefuzzificationException



17.2.1 Methods

Inherited from exceptions.Exception

`__init__()`, `__new__()`

Inherited from exceptions.BaseException

`__delattr__()`, `__getattr__()`, `__getitem__()`, `__getslice__()`, `__reduce__()`, `__repr__()`,
`__setattr__()`, `__setstate__()`, `__str__()`

Inherited from object

`__hash__()`, `__reduce_ex__()`

17.2.2 Properties

Name	Description
<i>Inherited from exceptions.BaseException</i>	
args, message	
<i>Inherited from object</i>	
<code>__class__</code>	

17.3 Class Base



Known Subclasses: fuzzy.defuzzify.COGS.COGS, fuzzy.defuzzify.RM.RM, fuzzy.defuzzify.COG.COG, fuzzy.defuzzify.Dict.Dict, fuzzy.defuzzify.MaxLeft.MaxLeft, fuzzy.defuzzify.LM.LM, fuzzy.defuzzify.MaxRight.MaxRight

Abstract base class for defuzzification which results in a numeric value.

17.3.1 Methods

<code>__init__(self, INF=None, ACC=None)</code>
<code>x.__init__(...)</code> initializes x; see <code>x.__class__.__doc__</code> for signature
Parameters
INF : inference norm, used with set of adjective and given value for it (<i>type</i> = <code>fuzzy.norm.Norm.Norm</code>)
ACC : norm for accumulation of set of adjectives (<i>type</i> = <code>fuzzy.norm.Norm.Norm</code>)
Overrides: <code>object.__init__</code>

<code>getValue(self, variable)</code>
Defuzzification.

<code>accumulate(self, variable, segment.size=None)</code>
combining adjective values into one set

<code>value_table(self, set)</code>
get a value table of the polygon representation

Inherited from object

`__delattr__()`, `__getattr__()`, `__hash__()`, `__new__()`, `__reduce__()`, `__reduce_ex__()`, `__repr__()`, `__setattr__()`, `__str__()`

17.3.2 Properties

Name	Description
<i>Inherited from object</i>	

continued on next page

Name	Description
<code>--class--</code>	

17.3.3 Instance Variables

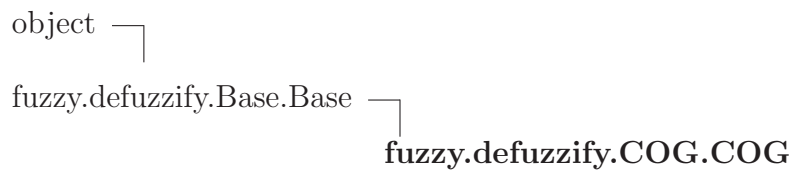
Name	Description
ACC	norm for accumulation of set of adjectives (<i>type=fuzzy.norm.Norm.Norm</i>)
INF	inference norm, used with set of adjective and given value for it (<i>type=fuzzy.norm.Norm.Norm</i>)
accumulated_set	result of accumulation of activated sets (<i>type=fuzzy.set.Polygon.Polygon</i>)
activated_sets	results of activation of adjectives of variable. (<i>type={string:fuzzy.set.Polygon.Polygon}</i>)

18 Module fuzzy.defuzzify.COG

18.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: COG.py,v 1.5 2009/08/07 07:19:18 rliebscher Exp \$'

18.2 Class COG



defuzzification which uses the center of gravity method.

18.2.1 Methods

<code>__init__(self, INF=None, ACC=None, failsafe=None, segment_size=None, *args, **keywords)</code>
<code>x.__init__(...)</code> initializes x; see <code>x.__class__.__doc__</code> for signature
Parameters
<code>failsafe:</code> if is not possible to calculate a center of gravity, return this value if not None or forward the exception
<code>segment_size:</code> maximum length of segment in polygon of accumulated result set
Overrides: <code>object.__init__</code>

<code>getValue(self, variable)</code>
Defuzzification using center of gravity method.
Overrides: <code>fuzzy.defuzzify.Base.Base.getValue</code>

Inherited from `fuzzy.defuzzify.Base.Base` (Section 17.3)

`accumulate()`, `value.table()`

Inherited from `object`

`__delattr__()`, `__getattr__()`, `__hash__()`, `__new__()`, `__reduce__()`, `__reduce_ex__()`,
`__repr__()`, `__setattr__()`, `__str__()`

18.2.2 Properties

Name	Description
<i>Inherited from object</i>	
<code>__class__</code>	

18.2.3 Instance Variables

Name	Description
<i>Inherited from fuzzy.defuzzify.Base.Base (Section 17.3)</i>	
<code>ACC</code> , <code>INF</code> , <code>accumulated_set</code> , <code>activated_sets</code>	

19 Module fuzzy.defuzzify.COGS

19.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: COGS.py,v 1.4 2009/08/07 07:19:18 rliebscher Exp \$'

19.2 Class COGS



defuzzification for singletons.

19.2.1 Methods

<code>__init__(self, INF=None, ACC=None, failsafe=None, *args, **keywords)</code>
<code>x.__init__(...)</code> initializes x; see <code>x.__class__.__doc__</code> for signature
Parameters
<code>failsafe</code>: if is not possible to calculate a center of gravity, return this value if not None or forward the exception
Overrides: <code>object.__init__</code>

<code>getValue(self, variable)</code>
Defuzzification using center of gravity method.
Overrides: <code>fuzzy.defuzzify.Base.Base.getValue</code>

Inherited from `fuzzy.defuzzify.Base.Base`(Section 17.3)

`accumulate()`, `value.table()`

Inherited from `object`

`__delattr__()`, `__getattr__()`, `__hash__()`, `__new__()`, `__reduce__()`, `__reduce_ex__()`, `__repr__()`, `__setattr__()`, `__str__()`

19.2.2 Properties

Name	Description
<i>Inherited from object</i> __class__	

19.2.3 Instance Variables

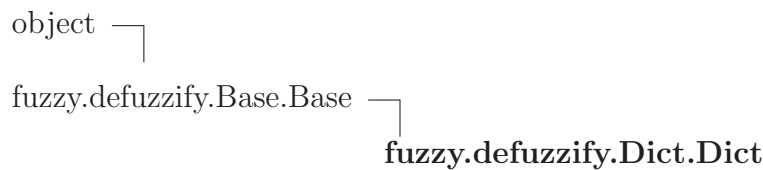
Name	Description
<i>Inherited from fuzzy.defuzzify.Base.Base (Section 17.3)</i> ACC, INF, accumulated_set, activated_sets	

20 Module fuzzy.defuzzify.Dict

20.1 Variables

Name	Description
__revision__	Value: '\$Id: Dict.py,v 1.6 2009/08/31 21:02:06 rliebscher Exp \$'

20.2 Class Dict



Not a real defuzzification. Just stores the adjective memberships in a dictionary for output. You should use in the adjectives instances of Set itself.

What can be done with this?

For example:

You want help with buying a car.

Input are your preferences:

speed, payload (1-10), ...

(map to "very important, important, doesn't matter, not wanted, never" ;-)

Output are choices: cars with adjectives: ferrari, truck, ...

rules are as follows:

```

if speed->very_important && payload->never then car->ferrari
if payload->very_important then car->truck
  
```

... and so on

Then you use this as follows:

```

input_variables
{ speed:3, payload:1, ... }
==>
output_variables
{ car: {
  
```

```

        ferrari:0.1,
        truck: 1.0,
        ...
    }
}

```

20.2.1 Methods

__init__(self, *args, **keywords)

x.__init__(...) initializes x; see x.__class__.__doc__ for signature

Parameters

INF: inference norm, used with set of adjective and given value for it

ACC: norm for accumulation of set of adjectives

Overrides: object.__init__ extit(inherited documentation)

getValue(self, variable)

no defuzzification just return membership values

Overrides: fuzzy.defuzzify.Base.Base.getValue

Inherited from fuzzy.defuzzify.Base.Base (Section 17.3)

accumulate(), value.table()

Inherited from object

__delattr__(), __getattr__(), __hash__(), __new__(), __reduce__(), __reduce_ex__(),
__repr__(), __setattr__(), __str__()

20.2.2 Properties

Name	Description
<i>Inherited from object</i>	
__class__	

20.2.3 Instance Variables

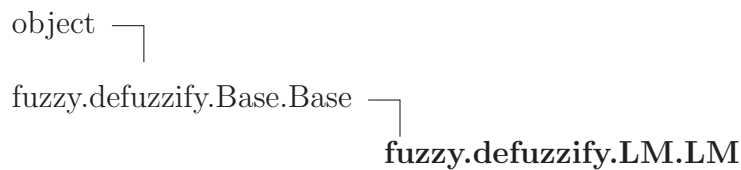
Name	Description
<i>Inherited from fuzzy.defuzzify.Base.Base (Section 17.3)</i>	
ACC, INF, accumulated_set, activated_sets	

21 Module fuzzy.defuzzify.LM

21.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: LM.py,v 1.2 2009/08/07 07:19:18 rliebscher Exp \$'

21.2 Class LM



Defuzzification which uses the left most (local) maximum.

21.2.1 Methods

<code>__init__(self, INF=None, ACC=None, failsafe=None, *args, **keywords)</code>
Initialize the defuzzification method with INF,ACC and an optional value in case defuzzification is not possible
Parameters
INF: inference norm, used with set of adjective and given value for it
ACC: norm for accumulation of set of adjectives
Overrides: <code>object.__init__</code>

<code>getValue(self, variable)</code>
Defuzzification.
Overrides: <code>fuzzy.defuzzify.Base.Base.getValue</code>

Inherited from `fuzzy.defuzzify.Base.Base`(Section 17.3)

`accumulate()`, `value_table()`

Inherited from `object`

`__delattr__()`, `__getattr__()`, `__hash__()`, `__new__()`, `__reduce__()`, `__reduce_ex__()`,
`__repr__()`, `__setattr__()`, `__str__()`

21.2.2 Properties

Name	Description
<i>Inherited from object</i> __class__	

21.2.3 Instance Variables

Name	Description
<i>Inherited from fuzzy.defuzzify.Base.Base (Section 17.3)</i> ACC, INF, accumulated_set, activated_sets	

22 Module fuzzy.defuzzify.MaxLeft

22.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: MaxLeft.py,v 1.4 2009/08/07 07:19:18 rliebscher Exp \$'

22.2 Class MaxLeft



Defuzzification which uses the left global maximum.

22.2.1 Methods

<code>__init__(self, INF=None, ACC=None, failsafe=None, *args, **keywords)</code>
Initialize the defuzzification method with INF,ACC and an optional value in case defuzzification is not possible
Parameters
INF : inference norm, used with set of adjective and given value for it
ACC : norm for accumulation of set of adjectives
Overrides: <code>object.__init__</code>

<code>getValue(self, variable)</code>
Defuzzification.
Overrides: <code>fuzzy.defuzzify.Base.Base.getValue</code>

Inherited from `fuzzy.defuzzify.Base.Base`(Section 17.3)

`accumulate()`, `value.table()`

Inherited from `object`

`__delattr__()`, `__getattr__()`, `__hash__()`, `__new__()`, `__reduce__()`, `__reduce_ex__()`,
`__repr__()`, `__setattr__()`, `__str__()`

22.2.2 Properties

Name	Description
<i>Inherited from object</i> __class__	

22.2.3 Instance Variables

Name	Description
<i>Inherited from fuzzy.defuzzify.Base.Base (Section 17.3)</i> ACC, INF, accumulated_set, activated_sets	

23 Module fuzzy.defuzzify.MaxRight

23.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: MaxRight.py,v 1.5 2009/08/07 07:19:18 rliebscher Ex...

23.2 Class MaxRight



Defuzzification which uses the right global maximum.

23.2.1 Methods

<code>__init__(self, INF=None, ACC=None, failsafe=None, *args, **keywords)</code>
Initialize the defuzzification method with INF,ACC and an optional value in case defuzzification is not possible
Parameters
INF : inference norm, used with set of adjective and given value for it
ACC : norm for accumulation of set of adjectives
Overrides: <code>object.__init__</code>

<code>getValue(self, variable)</code>
Defuzzification.
Overrides: <code>fuzzy.defuzzify.Base.Base.getValue</code>

Inherited from `fuzzy.defuzzify.Base.Base` (Section 17.3)

`accumulate(), value_table()`

Inherited from `object`

`__delattr__(), __getattr__(), __hash__(), __new__(), __reduce__(), __reduce_ex__(), __repr__(), __setattr__(), __str__()`

23.2.2 Properties

Name	Description
<i>Inherited from object</i> __class__	

23.2.3 Instance Variables

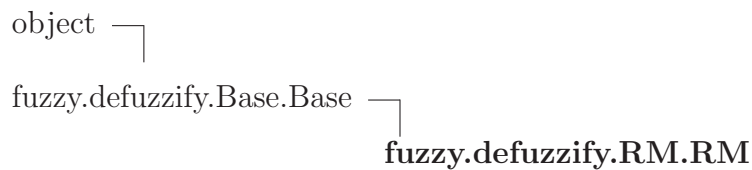
Name	Description
<i>Inherited from fuzzy.defuzzify.Base.Base (Section 17.3)</i> ACC, INF, accumulated_set, activated_sets	

24 Module fuzzy.defuzzify.RM

24.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: RM.py,v 1.2 2009/08/07 07:19:18 rliebscher Exp \$'

24.2 Class RM



Defuzzification which uses the right most (local) maximum.

24.2.1 Methods

<code>__init__(self, INF=None, ACC=None, failsafe=None, *args, **keywords)</code>
Initialize the defuzzification method with INF,ACC and an optional value in case defuzzification is not possible
Parameters
INF: inference norm, used with set of adjective and given value for it
ACC: norm for accumulation of set of adjectives
Overrides: <code>object.__init__</code>

<code>getValue(self, variable)</code>
Defuzzification.
Overrides: <code>fuzzy.defuzzify.Base.Base.getValue</code>

Inherited from `fuzzy.defuzzify.Base.Base`(Section 17.3)

`accumulate()`, `value_table()`

Inherited from `object`

`__delattr__()`, `__getattr__()`, `__hash__()`, `__new__()`, `__reduce__()`, `__reduce_ex__()`,
`__repr__()`, `__setattr__()`, `__str__()`

24.2.2 Properties

Name	Description
<i>Inherited from object</i> __class__	

24.2.3 Instance Variables

Name	Description
<i>Inherited from fuzzy.defuzzify.Base.Base (Section 17.3)</i> ACC, INF, accumulated_set, activated_sets	

25 Package fuzzy.doc

Helpers to generate documentation of a fuzzy system

25.1 Modules

- **plot**: Generate documentation by plotting some parts of the system
(Section 26, p. 66)
 - **gnuplot**: Documentation
(Section 27, p. 67)
 - * **doc**: Plotting of variables, adjectives, ...
(Section 28, p. 68)
- **structure**: Generate documentation of structure of system
(Section 29, p. 74)
 - **dot**: Documentation
(Section 30, p. 75)
 - * **dot**: Generates description of structure in dot format
(Section 31, p. 76)
 - * **handlers**: Handlers for different object types which print the object in dot format
(Section 32, p. 77)

25.2 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: __init__.py,v 1.3 2009/08/07 07:19:18 rliebscher Ex...

26 Package fuzzy.doc.plot

Generate documentation by plotting some parts of the system

26.1 Modules

- **gnuplot**: Documentation
(Section 27, p. 67)
 - **doc**: Plotting of variables, adjectives, ...
(Section 28, p. 68)

26.2 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: __init__.py,v 1.2 2009/08/07 07:19:18 rliebscher Ex...

27 Package fuzzy.doc.plot.gnuplot

Documentation

27.1 Modules

- **doc**: Plotting of variables, adjectives, ...
(Section 28, p. 68)

27.2 Variables

Name	Description
__revision__	Value: '\$Id: __init__.py,v 1.2 2009/08/07 07:19:18 rliebscher Ex...

28 Module *fuzzy.doc.plot.gnuplot.doc*

Plotting of variables, adjectives, ... using gnuplot

28.1 Functions

getMinMax (<i>set</i>)

get tuple with minimum and maximum x-values used by the set.
--

getGlobalMinMax (<i>sets</i>)
--

get tuple with minimum and maximum x-values used by the sets of this dict of sets.
--

getPoints (<i>sets</i>)

Collect all important points of all adjectives in this dict of sets.
--

getSets (<i>variable</i>)

Get all sets of adjectives in this variable.
--

28.2 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: doc.py,v 1.9 2009/09/24 20:32:20 rliebscher Exp \$'

28.3 Class Doc

object  **fuzzy.doc.plot.gnuplot.doc.Doc**

Main object. Get an instance of this to do your work.

28.3.1 Methods

`__init__(self, directory='doc')`

`x.__init__(...)` initializes `x`; see `x.__class__.__doc__` for signature

Overrides: `object.__init__` `exitit`(inherited documentation)

`setTerminal(self, g, filename)`

`initGnuplot2D(self, filename='plot', xlabel=None, ylabel=None, title=None, xrange_=None, yrange=None, x_logscale=0, y_logscale=0)`

`initGnuplot3D(self, filename='plot3D', xlabel=None, ylabel=None, zlabel=None, title=None, xrange_=None, yrange=None, zrange=None, x_logscale=0, y_logscale=0, z_logscale=0)`

`getValues(self, v)`

`getValuesSets(self, sets)`

`createDoc(self, system)`

create plots of all variables defined in the given system.

`createDocVariable(self, v, name, x_logscale=0, y_logscale=0)`

Creates a 2D plot of a variable

`createDocSets(self, sets, name, x_logscale=0, y_logscale=0, description=None, units=None)`

Creates a 2D plot of dict of sets

```
create2DPlot(self, system, x_name, y_name, input_dict={}, output_dict={},  
x_logscale=0, y_logscale=0)
```

Creates a 2D plot of an input variable and an output variable. Other (const) variables have to be set beforehand in the dictionary input_dict.

Parameters

system:	the fuzzy system to use (<i>type=fuzzy.System.System</i>)
x_name:	name of input variable used for x coordinate values (<i>type=string</i>)
y_name:	name of output variable used for y coordinate values (<i>type=string</i>)
input_dict:	dictionary used for input values, can be used to predefine other input values (<i>type=dict</i>)
output_dict:	dictionary used for output values (<i>type=dict</i>)
x_logscale:	use logarithmic scale for x values (<i>type=bool</i>)
y_logscale:	use logarithmic scale for y values (<i>type=bool</i>)

```
create3DPlot(self, system, x_name, y_name, z_name, input_dict={},  
output_dict={}, x_logscale=0, y_logscale=0, z_logscale=0)
```

Creates a 3D plot of 2 input variables and an output variable. Other (const) variables have to be set beforehand in the dictionary `input_dict`.

Parameters

system:	the fuzzy system to use (<i>type=fuzzy.System.System</i>)
x_name:	name of input variable used for x coordinate values (<i>type=string</i>)
y_name:	name of input variable used for y coordinate values (<i>type=string</i>)
z_name:	name of output variable used for z coordinate values (<i>type=string</i>)
input_dict:	dictionary used for input values, can be used to predefine other input values (<i>type=dict</i>)
output_dict:	dictionary used for output values (<i>type=dict</i>)
x_logscale:	use logarithmic scale for x values (<i>type=bool</i>)
y_logscale:	use logarithmic scale for y values (<i>type=bool</i>)
z_logscale:	use logarithmic scale for z values (<i>type=bool</i>)

```
create3DPlot_adjective(self, system, x_name, y_name, z_name, adjective,
input_dict={}, output_dict={}, x_logscale=0, y_logscale=0, z_logscale=0)
```

Creates a 3D plot of 2 input variables and an adjective of the output variable. Other (const) variables have to be set beforehand in the dictionary `input_dict`.

Parameters

system:	the fuzzy system to use (<i>type=fuzzy.System.System</i>)
x_name:	name of input variable used for x coordinate values (<i>type=string</i>)
y_name:	name of input variable used for y coordinate values (<i>type=string</i>)
z_name:	name of output variable used for z coordinate values (<i>type=string</i>)
adjective:	name of adjective of output variable used for z coordinate values (<i>type=string</i>)
input_dict:	dictionary used for input values, can be used to predefine other input values (<i>type=dict</i>)
output_dict:	dictionary used for output values (<i>type=dict</i>)
x_logscale:	use logarithmic scale for x values (<i>type=bool</i>)
y_logscale:	use logarithmic scale for y values (<i>type=bool</i>)
z_logscale:	use logarithmic scale for z values (<i>type=bool</i>)

Inherited from object

```
__delattr__(), __getattr__(), __hash__(), __new__(), __reduce__(), __reduce_ex__(),
__repr__(), __setattr__(), __str__()
```

28.3.2 Properties

Name	Description
<i>Inherited from object</i> __class__	

28.3.3 Instance Variables

Name	Description
overscan	the plotted range is $[min-o, max+o]$ with $o=(max-min)*overscan$

29 Package fuzzy.doc.structure

Generate documentation of structure of system

29.1 Modules

- **dot**: Documentation
(Section 30, p. 75)
 - **dot**: Generates description of structure in dot format
(Section 31, p. 76)
 - **handlers**: Handlers for different object types which print the object in dot format
(Section 32, p. 77)

29.2 Variables

Name	Description
__revision__	Value: '\$Id: __init__.py,v 1.2 2009/08/07 07:19:18 rliebscher Ex...

30 Package fuzzy.doc.structure.dot

Documentation

30.1 Modules

- **dot**: Generates description of structure in dot format
(Section 31, p. 76)
- **handlers**: Handlers for different object types which print the object in dot format
(Section 32, p. 77)

30.2 Variables

Name	Description
__revision__	Value: '\$Id: __init__.py,v 1.2 2009/08/07 07:19:18 rliebscher Ex...

31 Module fuzzy.doc.structure.dot.dot

Generates description of structure in dot format

31.1 Functions

register_handler (<i>class_</i> , <i>handler</i>)
--

print_dot (<i>obj</i> , <i>out</i> , <i>system</i> , <i>parentname</i>)
--

Print object <i>obj</i> into output stream <i>out</i>

printVariablesDot (<i>system</i> , <i>out</i>)

Print all variables

printRulesDot (<i>system</i> , <i>out</i>)

Print all rules

printDot (<i>system</i> , <i>out</i>)
--

Print whole system into one graph

print_header (<i>out</i> , <i>name</i> ='System')

Print graph header

print_footer (<i>out</i>)

Print graph footer

31.2 Variables

Name	Description
__revision__	Value: '\$Id: dot.py,v 1.4 2009/08/07 07:19:18 rliebscher Exp \$'

32 Module fuzzy.doc.structure.dot.handlers

Handlers for different object types which print the object in dot format

32.1 Functions

ID (<i>obj</i>)
Get an unique ID from object for dot node names

32.2 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: handlers.py,v 1.5 2009/08/07 07:19:18 rliebscher Ex...

32.3 Class DocBase

object └─ **fuzzy.doc.structure.dot.handlers.DocBase**

Known Subclasses: fuzzy.doc.structure.dot.handlers.Doc_Adjective, fuzzy.doc.structure.dot.handlers.Doc_Const, fuzzy.doc.structure.dot.handlers.Doc_Input, fuzzy.doc.structure.dot.handlers.Doc_Not, fuzzy.doc.structure.dot.handlers.Doc_Variable, fuzzy.doc.structure.dot.handlers.Doc_...

'Abstract' Base class for everything else

32.3.1 Methods

__init__ (<i>self</i>)
x.__init__(...) initializes x; see x.__class__.__doc__ for signature
Overrides: object.__init__ extit(inherited documentation)

make_node (<i>self</i> , <i>out</i> , <i>name</i> , <i>values</i> ={})
--

make_connection (<i>self</i> , <i>out</i> , <i>node1</i> , <i>node2</i> , <i>values</i> ={})
--

Inherited from object

`__delattr__()`, `__getattr__()`, `__hash__()`, `__new__()`, `__reduce__()`, `__reduce_ex__()`,
`__repr__()`, `__setattr__()`, `__str__()`

32.3.2 Properties

Name	Description
<i>Inherited from object</i>	
<code>__class__</code>	

32.4 Class `Doc_Compound`



32.4.1 Methods

<code>__init__(self)</code> <code>x.__init__(...)</code> initializes x; see <code>x.__class__.__doc__</code> for signature Overrides: <code>object.__init__</code> extit(inherited documentation)
<code>__call__(self, obj, out, system, parent_name)</code>

Inherited from `fuzzy.doc.structure.dot.handlers.DocBase` (Section 32.3)

`make_connection()`, `make_node()`

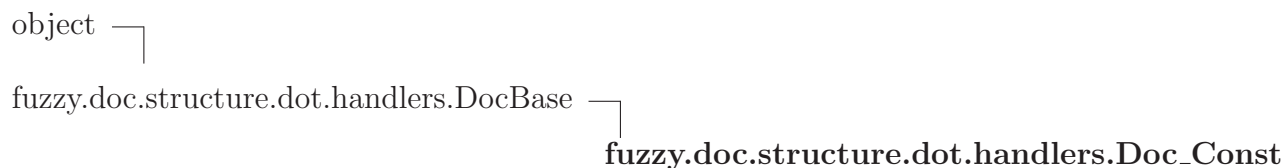
Inherited from `object`

`__delattr__()`, `__getattr__()`, `__hash__()`, `__new__()`, `__reduce__()`, `__reduce_ex__()`,
`__repr__()`, `__setattr__()`, `__str__()`

32.4.2 Properties

Name	Description
<i>Inherited from object</i>	
<code>__class__</code>	

32.5 Class *Doc_Const*



32.5.1 Methods

<code>--call--(<i>self</i>, <i>obj</i>, <i>out</i>, <i>system</i>, <i>parent_name</i>)</code>

Inherited from `fuzzy.doc.structure.dot.handlers.DocBase`(Section 32.3)

`--init--()`, `make_connection()`, `make_node()`

Inherited from `object`

`--delattr--()`, `--getattrattribute--()`, `--hash--()`, `--new--()`, `--reduce--()`, `--reduce_ex--()`,
`--repr--()`, `--setattr--()`, `--str--()`

32.5.2 Properties

Name	Description
<i>Inherited from <code>object</code></i>	
<code>--class--</code>	

32.6 Class *Doc_Input*



32.6.1 Methods

<code>--call--(<i>self</i>, <i>obj</i>, <i>out</i>, <i>system</i>, <i>parent_name</i>)</code>

Inherited from `fuzzy.doc.structure.dot.handlers.DocBase`(Section 32.3)

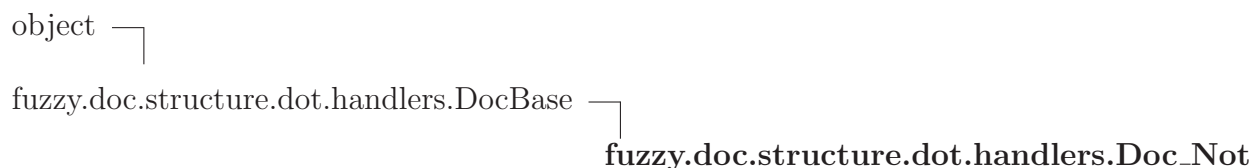
`--init--()`, `make_connection()`, `make_node()`

Inherited from object

`__delattr__()`, `__getattr__()`, `__hash__()`, `__new__()`, `__reduce__()`, `__reduce_ex__()`,
`__repr__()`, `__setattr__()`, `__str__()`

32.6.2 Properties

Name	Description
<i>Inherited from object</i>	
<code>__class__</code>	

32.7 Class Doc_Not**32.7.1 Methods**

<code>__init__(self)</code>
x. <code>__init__</code> (...) initializes x; see x. <code>__class__</code> . <code>__doc__</code> for signature
Overrides: object. <code>__init__</code> extit(inherited documentation)

<code>__call__(self, obj, out, system, parent_name)</code>
--

Inherited from fuzzy.doc.structure.dot.handlers.DocBase(Section 32.3)

`make_connection()`, `make_node()`

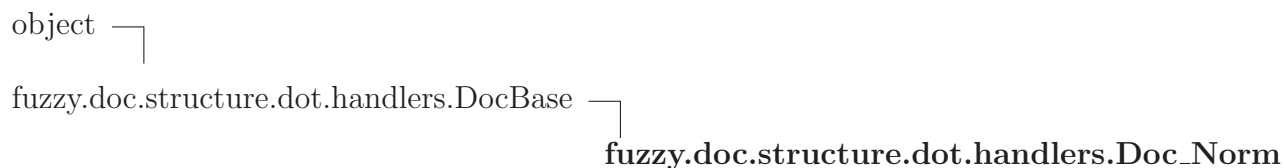
Inherited from object

`__delattr__()`, `__getattr__()`, `__hash__()`, `__new__()`, `__reduce__()`, `__reduce_ex__()`,
`__repr__()`, `__setattr__()`, `__str__()`

32.7.2 Properties

Name	Description
<i>Inherited from object</i>	
<code>__class__</code>	

32.8 Class *Doc_Norm*



Known Subclasses: *fuzzy.doc.structure.dot.handlers.Doc_ParametricNorm*

32.8.1 Methods

<code>--call--(<i>self</i>, <i>obj</i>, <i>out</i>, <i>system</i>, <i>parent_name</i>)</code>

Inherited from fuzzy.doc.structure.dot.handlers.DocBase(Section 32.3)

`--init--()`, `make_connection()`, `make_node()`

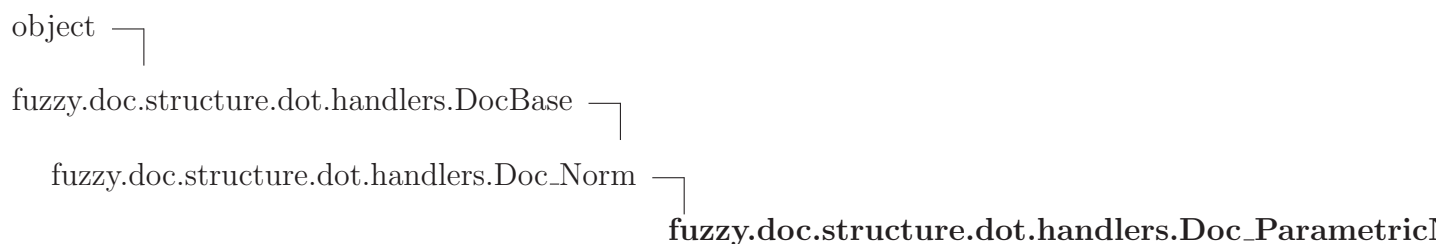
Inherited from object

`--delattr--()`, `--getattr--()`, `--hash--()`, `--new--()`, `--reduce--()`, `--reduce_ex--()`,
`--repr--()`, `--setattr--()`, `--str--()`

32.8.2 Properties

Name	Description
<i>Inherited from object</i>	
<code>--class--</code>	

32.9 Class *Doc_ParametricNorm*



32.9.1 Methods

`__call__(self, obj, out, system, parent_name)`

Overrides: `fuzzy.doc.structure.dot.handlers.Doc_Norm.__call__`

Inherited from `fuzzy.doc.structure.dot.handlers.DocBase` (Section 32.3)

`__init__()`, `make_connection()`, `make_node()`

Inherited from object

`__delattr__()`, `__getattr__()`, `__hash__()`, `__new__()`, `__reduce__()`, `__reduce_ex__()`,
`__repr__()`, `__setattr__()`, `__str__()`

32.9.2 Properties

Name	Description
<i>Inherited from object</i>	
<code>__class__</code>	

32.10 Class `Doc_Adjective`



32.10.1 Methods

`__init__(self)`

`x.__init__(...)` initializes x; see `x.__class__.__doc__` for signature

Overrides: `object.__init__` extit(inherited documentation)

`__call__(self, obj, out, system, parent_name)`

Inherited from `fuzzy.doc.structure.dot.handlers.DocBase` (Section 32.3)

`make_connection()`, `make_node()`

Inherited from object

`__delattr__()`, `__getattr__()`, `__hash__()`, `__new__()`, `__reduce__()`, `__reduce_ex__()`,
`__repr__()`, `__setattr__()`, `__str__()`

32.10.2 Properties

Name	Description
<i>Inherited from object</i>	
<code>__class__</code>	

32.11 Class *Doc_Rule*



32.11.1 Methods

<code>__init__(self)</code> <code>x.__init__(...)</code> initializes x; see <code>x.__class__.__doc__</code> for signature Overrides: <code>object.__init__</code> extit(inherited documentation)
<code>__call__(self, obj, out, system, parent_name)</code>

Inherited from `fuzzy.doc.structure.dot.handlers.DocBase` (Section 32.3)

`make_connection()`, `make_node()`

Inherited from object

`__delattr__()`, `__getattr__()`, `__hash__()`, `__new__()`, `__reduce__()`, `__reduce_ex__()`,
`__repr__()`, `__setattr__()`, `__str__()`

32.11.2 Properties

Name	Description
<i>Inherited from object</i>	
<code>__class__</code>	

32.12 Class `Doc_Variable`



Known Subclasses: `fuzzy.doc.structure.dot.handlers.Doc_OutputVariable`

32.12.1 Methods

`__init__(self)`

`x.__init__(...)` initializes `x`; see `x.__class__.__doc__` for signature

Overrides: `object.__init__` `exitit` (inherited documentation)

`__call__(self, obj, out, system, parent_name)`

Inherited from `fuzzy.doc.structure.dot.handlers.DocBase` (Section 32.3)

`make_connection()`, `make_node()`

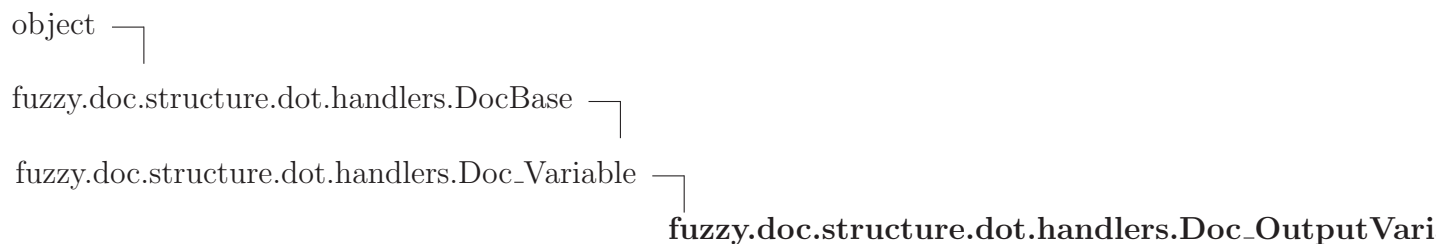
Inherited from `object`

`__delattr__()`, `__getattr__()`, `__hash__()`, `__new__()`, `__reduce__()`, `__reduce_ex__()`,
`__repr__()`, `__setattr__()`, `__str__()`

32.12.2 Properties

Name	Description
<i>Inherited from <code>object</code></i>	
<code>__class__</code>	

32.13 Class `Doc_OutputVariable`



32.13.1 Methods

`make_connection`(*self*, *out*, *node1*, *node2*, *values*={})
 Overrides: `fuzzy.doc.structure.dot.handlers.DocBase.make_connection`

Inherited from `fuzzy.doc.structure.dot.handlers.Doc_Variable` (Section 32.12)

`--call--()`, `--init--()`

Inherited from `fuzzy.doc.structure.dot.handlers.DocBase` (Section 32.3)

`make_node()`

Inherited from `object`

`--delattr--()`, `--getattr--()`, `--hash--()`, `--new--()`, `--reduce--()`, `--reduce_ex--()`,
`--repr--()`, `--setattr--()`, `--str--()`

32.13.2 Properties

Name	Description
<i>Inherited from <code>object</code></i>	
<code>--class--</code>	

33 Package fuzzy.fuzzify

Fuzzyfication functions.

33.1 Modules

- **Base** (*Section 34, p. 87*)
- **Dict** (*Section 35, p. 88*)
- **Plain** (*Section 36, p. 90*)

33.2 Variables

Name	Description
__revision__	Value: '\$Id: __init__.py,v 1.2 2009/08/07 07:19:18 rliebscher Ex...

34 Module fuzzy.fuzzify.Base

34.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: Base.py,v 1.2 2009/08/07 07:19:18 rliebscher Exp \$'

34.2 Class Base



Known Subclasses: fuzzy.fuzzify.Plain.Plain, fuzzy.fuzzify.Dict.Dict

base class for all fuzzification methods

34.2.1 Methods

```
__init__(self, *args, **keywords)
```

`x.__init__(...)` initializes `x`; see `x.__class__.__doc__` for signature

Overrides: `object.__init__` extit(inherited documentation)

```
setValue(self, variable, value)
```

Inherited from object

`__delattr__()`, `__getattr__()`, `__hash__()`, `__new__()`, `__reduce__()`, `__reduce_ex__()`,
`__repr__()`, `__setattr__()`, `__str__()`

34.2.2 Properties

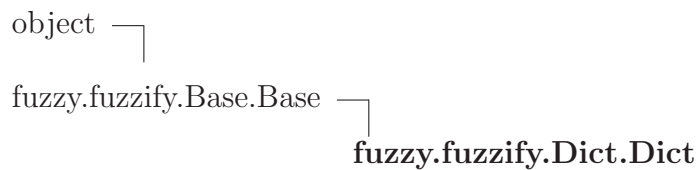
Name	Description
<i>Inherited from object</i>	
<code>__class__</code>	

35 Module fuzzy.fuzzify.Dict

35.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: Dict.py,v 1.3 2009/08/31 21:02:06 rliebscher Exp \$'

35.2 Class Dict



Fuzzification method which gets adjective memberships in a dictionary instead of values to fuzzify. You should use in the adjectives instances of Set itself.

Q : What can be done with this?

A : Break complexity, by divide big and heavy fuzzy systems into small ones :

```

input1 ----> *****
input2 ----> * FIS *
input3 ----> *      * -----> output
input4 ----> *****

```

should be:

```

input1 ----> *****
input2 ----> *FIS 1* ----+
                ***** |
                        +--> *****
input3 ----> ***** -----> *FIS 3* ----> output
input4 ----> *FIS 2*          *****
                *****

```

Q : Why don't defuzzify outputs of FIS1 and FIS2 ?

A : Defuzzification mean data loss.

35.2.1 Methods

`--init--`(*self*, **args*, ***keywords*)

`x.--init--(...)` initializes `x`; see `x.--class--.--doc--` for signature

Overrides: `object.--init--` extit(inherited documentation)

`setValue`(*self*, *variable*, *value*)

Do not let adjectives calculate their membership values.

Overrides: `fuzzy.fuzzify.Base.Base.setValue`

Inherited from object

`--delattr--()`, `--getattr--()`, `--hash--()`, `--new--()`, `--reduce--()`, `--reduce_ex--()`,
`--repr--()`, `--setattr--()`, `--str--()`

35.2.2 Properties

Name	Description
<i>Inherited from object</i>	
<code>--class--</code>	

36 Module fuzzy.fuzzify.Plain

36.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: Plain.py,v 1.2 2009/08/07 07:19:18 rliebscher Exp \$'

36.2 Class Plain



Just fuzzify the input value using the membership values of the given adjectives

36.2.1 Methods

```
__init__(self, *args, **keywords)
```

`x.__init__(...)` initializes `x`; see `x.__class__.__doc__` for signature

Overrides: `object.__init__` extit(inherited documentation)

```
setValue(self, variable, value)
```

Let adjectives calculate their membership values.

Overrides: `fuzzy.fuzzify.Base.Base.setValue`

Inherited from object

```
__delattr__(), __getattr__(), __hash__(), __new__(), __reduce__(), __reduce_ex__(),  

__repr__(), __setattr__(), __str__()
```

36.2.2 Properties

Name	Description
<i>Inherited from object</i>	
<code>__class__</code>	

37 Package `fuzzy.norm`

This package contains all realized fuzzy norms.

Examples can be found here <http://pyfuzzy.sourceforge.net/demo/norm/>

37.1 Modules

- **AlgebraicProdSum** (*Section 38, p. 93*)
- **AlgebraicProduct** (*Section 39, p. 95*)
- **AlgebraicSum** (*Section 40, p. 97*)
- **ArithmeticMean** (*Section 41, p. 99*)
- **BoundedDifference** (*Section 42, p. 101*)
- **BoundedSum** (*Section 43, p. 103*)
- **DombiIntersection** (*Section 44, p. 105*)
- **DombiUnion** (*Section 45, p. 107*)
- **DrasticProduct** (*Section 46, p. 109*)
- **DrasticSum** (*Section 47, p. 111*)
- **DualOfGeometricMean** (*Section 48, p. 113*)
- **DualOfHarmonicMean** (*Section 49, p. 115*)
- **DubiosPradeIntersection** (*Section 50, p. 117*)
- **DubiosPradeUnion** (*Section 51, p. 119*)
- **EinsteinProduct** (*Section 52, p. 121*)
- **EinsteinSum** (*Section 53, p. 123*)
- **FrankIntersection** (*Section 54, p. 125*)
- **FrankUnion** (*Section 55, p. 127*)
- **FuzzyAnd** (*Section 56, p. 129*)
- **FuzzyOr** (*Section 57, p. 131*)
- **GammaOperator** (*Section 58, p. 133*)
- **GeometricMean** (*Section 59, p. 135*)
- **HamacherIntersection** (*Section 60, p. 137*)
- **HamacherProduct** (*Section 61, p. 139*)
- **HamacherSum** (*Section 62, p. 141*)
- **HamacherUnion** (*Section 63, p. 143*)
- **HarmonicMean** (*Section 64, p. 145*)
- **Max** (*Section 65, p. 147*)
- **Min** (*Section 66, p. 149*)
- **MinMax** (*Section 67, p. 151*)
- **Norm**: Abstract base class for any kind of fuzzy norm.
(*Section 68, p. 153*)
- **ParametricNorm**: Base class for any kind of parametric fuzzy norm.
(*Section 69, p. 157*)
- **SchweizerIntersection** (*Section 70, p. 159*)
- **SchweizerIntersection2** (*Section 71, p. 161*)

- **SchweizerIntersection3** (*Section 72, p. 163*)
- **SchweizerUnion** (*Section 73, p. 165*)
- **SchweizerUnion2** (*Section 74, p. 167*)
- **SchweizerUnion3** (*Section 75, p. 169*)
- **YagerIntersection** (*Section 76, p. 171*)
- **YagerUnion** (*Section 77, p. 173*)

37.2 Variables

Name	Description
<code>--revision--</code>	Value: '\$Id: __init__.py,v 1.5 2009/08/07 07:19:19 rliebscher Ex...

38 Module fuzzy.norm.AlgebraicProdSum

38.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: AlgebraicProdSum.py,v 1.4 2009/09/24 20:32:20 rlieb...

38.2 Class AlgebraicProdSum

object └

fuzzy.norm.Norm.Norm └

fuzzy.norm.ParametricNorm.ParametricNorm └
 fuzzy.norm.AlgebraicProdSum.AlgebraicProdSum

38.2.1 Methods

`__init__(self, p=0.5)`

Initialize type and parameter

Parameters

`p`: parameter for norm

Overrides: object.__init__ extit(inherited documentation)

```
--call--(self, *args)
```

Calculate result of norm(arg1,arg2,...)

Parameters

args: list of floats as arguments for norm.

Return Value

result of norm calculation

(*type=float*)

Raises

NormException any problem in calculation (wrong number of arguments, numerical problems)

Overrides: fuzzy.norm.Norm.Norm.__call__ exitit(inherited documentation)

Inherited from fuzzy.norm.Norm.Norm(Section 68.4)

getType()

Inherited from object

__delattr__(), __getattr__(), __hash__(), __new__(), __reduce__(), __reduce_ex__(),
__repr__(), __setattr__(), __str__()

38.2.2 Properties

Name	Description
<i>Inherited from fuzzy.norm.ParametricNorm.ParametricNorm (Section 69.2)</i>	
p_range	
<i>Inherited from object</i>	
__class__	

38.2.3 Class Variables

Name	Description
<i>Inherited from fuzzy.norm.Norm.Norm (Section 68.4)</i>	
S_NORM, T_NORM, UNKNOWN	

38.2.4 Instance Variables

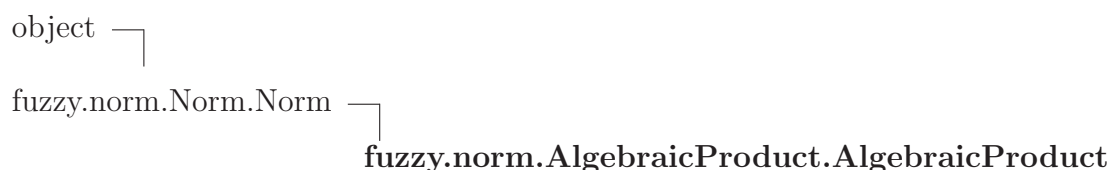
Name	Description
<i>Inherited from fuzzy.norm.ParametricNorm.ParametricNorm (Section 69.2)</i>	
p	

39 Module fuzzy.norm.AlgebraicProduct

39.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: AlgebraicProduct.py,v 1.3 2009/08/07 07:19:18 rlieb...

39.2 Class AlgebraicProduct



39.2.1 Methods

`__init__`(*self*)

Initialize type of norm

Overrides: `object.__init__` `exitit`(inherited documentation)

`__call__`(*self*, **args*)

Calculate result of norm(*arg1*,*arg2*,...)

Parameters

args: list of floats as arguments for norm.

Return Value

result of norm calculation

(*type=float*)

Raises

NormException any problem in calculation (wrong number of arguments, numerical problems)

Overrides: `fuzzy.norm.Norm.Norm.__call__` `exitit`(inherited documentation)

Inherited from fuzzy.norm.Norm.Norm(Section 68.4)

`getType`()

Inherited from object

`__delattr__()`, `__getattr__()`, `__hash__()`, `__new__()`, `__reduce__()`, `__reduce_ex__()`,
`__repr__()`, `__setattr__()`, `__str__()`

39.2.2 Properties

Name	Description
<i>Inherited from object</i>	
<code>__class__</code>	

39.2.3 Class Variables

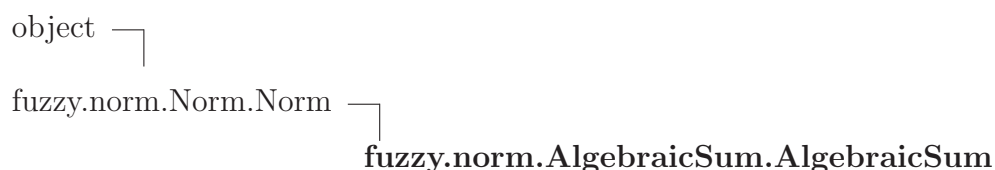
Name	Description
<i>Inherited from fuzzy.norm.Norm.Norm (Section 68.4)</i>	
<code>S_NORM</code> , <code>T_NORM</code> , <code>UNKNOWN</code>	

40 Module fuzzy.norm.AlgebraicSum

40.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: AlgebraicSum.py,v 1.3 2009/08/07 07:19:18 rliebsche...'

40.2 Class AlgebraicSum



40.2.1 Methods

`__init__`(*self*)

Initialize type of norm

Overrides: `object.__init__` extit(inherited documentation)

`__call__`(*self*, **args*)

Calculate result of norm(*arg1*,*arg2*,...)

Parameters

args: list of floats as arguments for norm.

Return Value

result of norm calculation

(*type=float*)

Raises

NormException any problem in calculation (wrong number of arguments, numerical problems)

Overrides: `fuzzy.norm.Norm.Norm.__call__` extit(inherited documentation)

Inherited from fuzzy.norm.Norm.Norm(Section 68.4)

`getType()`

Inherited from object

`__delattr__()`, `__getattr__()`, `__hash__()`, `__new__()`, `__reduce__()`, `__reduce_ex__()`,
`__repr__()`, `__setattr__()`, `__str__()`

40.2.2 Properties

Name	Description
<i>Inherited from object</i>	
<code>__class__</code>	

40.2.3 Class Variables

Name	Description
<i>Inherited from fuzzy.norm.Norm.Norm (Section 68.4)</i>	
<code>S_NORM</code> , <code>T_NORM</code> , <code>UNKNOWN</code>	

41 Module *fuzzy.norm.ArithmeticMean*

41.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: ArithmeticMean.py,v 1.4 2009/08/07 07:19:19 rliebsc...

41.2 Class *ArithmeticMean*



41.2.1 Methods

<code>__init__(self)</code> Initialize type of norm Overrides: <code>object.__init__</code> <code>exitit</code> (inherited documentation)
<code>__call__(self, *args)</code> Calculate result of <code>norm(arg1,arg2,...)</code> Parameters args: list of floats as arguments for norm. Return Value result of norm calculation (<i>type=float</i>) Raises NormException any problem in calculation (wrong number of arguments, numerical problems) Overrides: <code>fuzzy.norm.Norm.Norm.__call__</code> <code>exitit</code> (inherited documentation)

Inherited from `fuzzy.norm.Norm.Norm`(Section 68.4)

`getType()`

Inherited from object

`__delattr__()`, `__getattr__()`, `__hash__()`, `__new__()`, `__reduce__()`, `__reduce_ex__()`,
`__repr__()`, `__setattr__()`, `__str__()`

41.2.2 Properties

Name	Description
<i>Inherited from object</i>	
<code>__class__</code>	

41.2.3 Class Variables

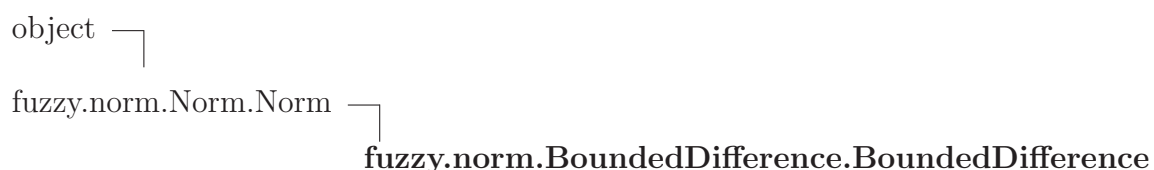
Name	Description
<i>Inherited from fuzzy.norm.Norm.Norm (Section 68.4)</i>	
<code>S_NORM</code> , <code>T_NORM</code> , <code>UNKNOWN</code>	

42 Module *fuzzy.norm.BoundedDifference*

42.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: BoundedDifference.py,v 1.3 2009/08/07 07:19:19 rlie...

42.2 Class *BoundedDifference*



42.2.1 Methods

`__init__(self)`

Initialize type of norm

Overrides: `object.__init__` `exitit`(inherited documentation)

`__call__(self, *args)`

Calculate result of `norm(arg1,arg2,...)`

Parameters

args: list of floats as arguments for norm.

Return Value

result of norm calculation

(*type=float*)

Raises

NormException any problem in calculation (wrong number of arguments, numerical problems)

Overrides: `fuzzy.norm.Norm.Norm.__call__` `exitit`(inherited documentation)

Inherited from `fuzzy.norm.Norm.Norm`(Section 68.4)

`getType()`

Inherited from object

`__delattr__()`, `__getattr__()`, `__hash__()`, `__new__()`, `__reduce__()`, `__reduce_ex__()`,
`__repr__()`, `__setattr__()`, `__str__()`

42.2.2 Properties

Name	Description
<i>Inherited from object</i>	
<code>__class__</code>	

42.2.3 Class Variables

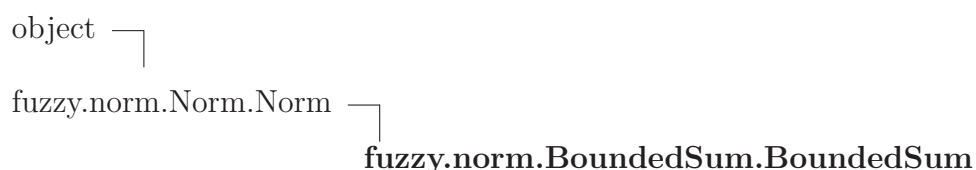
Name	Description
<i>Inherited from <code>fuzzy.norm.Norm.Norm</code> (Section 68.4)</i>	
<code>S_NORM</code> , <code>T_NORM</code> , <code>UNKNOWN</code>	

43 Module *fuzzy.norm.BoundedSum*

43.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: BoundedSum.py,v 1.3 2009/08/07 07:19:19 rliebscher ...

43.2 Class *BoundedSum*



43.2.1 Methods

`__init__(self)`

Initialize type of norm

Overrides: `object.__init__` `exitit`(inherited documentation)

`__call__(self, *args)`

Calculate result of `norm(arg1,arg2,...)`

Parameters

args: list of floats as arguments for norm.

Return Value

result of norm calculation

(*type=float*)

Raises

NormException any problem in calculation (wrong number of arguments, numerical problems)

Overrides: `fuzzy.norm.Norm.Norm.__call__` `exitit`(inherited documentation)

Inherited from `fuzzy.norm.Norm.Norm`(Section 68.4)

`getType()`

Inherited from object

`__delattr__()`, `__getattr__()`, `__hash__()`, `__new__()`, `__reduce__()`, `__reduce_ex__()`,
`__repr__()`, `__setattr__()`, `__str__()`

43.2.2 Properties

Name	Description
<i>Inherited from object</i>	
<code>__class__</code>	

43.2.3 Class Variables

Name	Description
<i>Inherited from fuzzy.norm.Norm.Norm (Section 68.4)</i>	
<code>S_NORM</code> , <code>T_NORM</code> , <code>UNKNOWN</code>	

44 Module `fuzzy.norm.DombiIntersection`

44.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: DombiIntersection.py,v 1.5 2009/08/31 21:02:06 rlie...

44.2 Class `DombiIntersection`

object └

fuzzy.norm.Norm.Norm └

fuzzy.norm.ParametricNorm.ParametricNorm └

fuzzy.norm.DombiIntersection.DombiIntersection

Dombi 1982

44.2.1 Methods

```
__init__(self, p=0.5)
```

Initialize type and parameter

Parameters

p: parameter for norm

Overrides: object.`__init__` extit(inherited documentation)

```
--call--(self, *args)
```

Calculate result of norm(arg1,arg2,...)

Parameters

args: list of floats as arguments for norm.

Return Value

result of norm calculation

(*type=float*)

Raises

NormException any problem in calculation (wrong number of arguments, numerical problems)

Overrides: *fuzzy.norm.Norm.Norm.__call__*

Inherited from fuzzy.norm.Norm.Norm(Section 68.4)

getType()

Inherited from object

__delattr__(), *__getattr__()*, *__hash__()*, *__new__()*, *__reduce__()*, *__reduce_ex__()*,
__repr__(), *__setattr__()*, *__str__()*

44.2.2 Properties

Name	Description
<i>Inherited from fuzzy.norm.ParametricNorm.ParametricNorm (Section 69.2)</i>	
<i>p_range</i>	
<i>Inherited from object</i>	
<i>__class__</i>	

44.2.3 Class Variables

Name	Description
<i>Inherited from fuzzy.norm.Norm.Norm (Section 68.4)</i>	
<i>S_NORM</i> , <i>T_NORM</i> , <i>UNKNOWN</i>	

44.2.4 Instance Variables

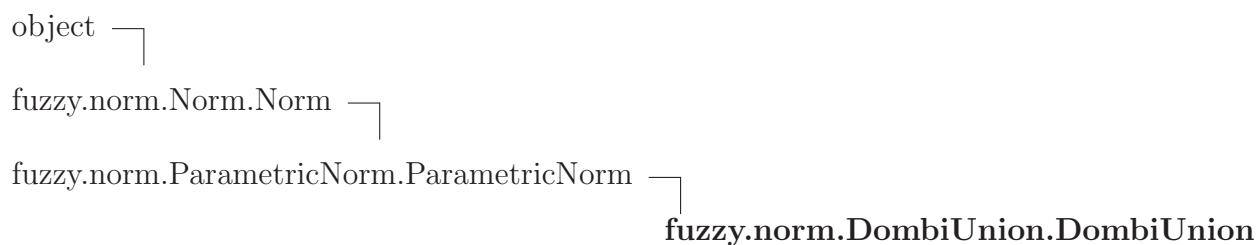
Name	Description
<i>Inherited from fuzzy.norm.ParametricNorm.ParametricNorm (Section 69.2)</i>	
<i>p</i>	

45 Module `fuzzy.norm.DombiUnion`

45.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: DombiUnion.py,v 1.5 2009/09/24 20:32:20 rliebscher ...

45.2 Class `DombiUnion`



Dombi 1982

45.2.1 Methods

```

__init__(self, p=0.5)
Initialize type and parameter
Parameters
    p: parameter for norm
Overrides: object.__init__ extit(inherited documentation)

```

```
--call--(self, *args)
```

Calculate result of norm(arg1,arg2,...)

Parameters

args: list of floats as arguments for norm.

Return Value

result of norm calculation

(*type=float*)

Raises

NormException any problem in calculation (wrong number of arguments, numerical problems)

Overrides: *fuzzy.norm.Norm.Norm.__call__* extit(inherited documentation)

Inherited from fuzzy.norm.Norm.Norm(Section 68.4)

getType()

Inherited from object

__delattr__(), *__getattr__()*, *__hash__()*, *__new__()*, *__reduce__()*, *__reduce_ex__()*,
__repr__(), *__setattr__()*, *__str__()*

45.2.2 Properties

Name	Description
<i>Inherited from fuzzy.norm.ParametricNorm.ParametricNorm (Section 69.2)</i>	
<i>p_range</i>	
<i>Inherited from object</i>	
<i>__class__</i>	

45.2.3 Class Variables

Name	Description
<i>Inherited from fuzzy.norm.Norm.Norm (Section 68.4)</i>	
<i>S_NORM</i> , <i>T_NORM</i> , <i>UNKNOWN</i>	

45.2.4 Instance Variables

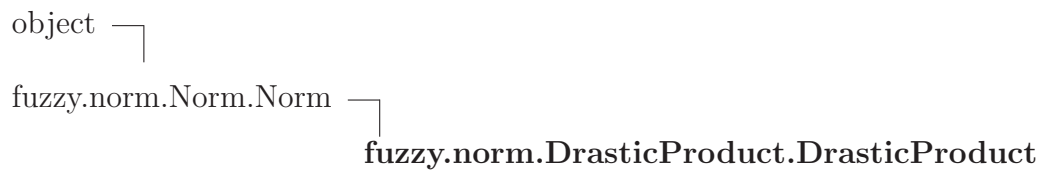
Name	Description
<i>Inherited from fuzzy.norm.ParametricNorm.ParametricNorm (Section 69.2)</i>	
<i>p</i>	

46 Module *fuzzy.norm.DrasticProduct*

46.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: DrasticProduct.py,v 1.4 2009/08/31 21:02:06 rliebsc...

46.2 Class *DrasticProduct*



46.2.1 Methods

<code>__init__</code> (<i>self</i>) Initialize type of norm Overrides: <code>object.__init__</code> <code>exitit</code> (inherited documentation)
<code>__call__</code> (<i>self</i> , * <i>args</i>) Calculate result of <code>norm(arg1,arg2,...)</code> Parameters <i>args</i> : list of floats as arguments for <code>norm</code> . Return Value result of <code>norm</code> calculation (<i>type=float</i>) Raises <code>NormException</code> any problem in calculation (wrong number of arguments, numerical problems) Overrides: <code>fuzzy.norm.Norm.Norm.__call__</code> <code>exitit</code> (inherited documentation)

Inherited from `fuzzy.norm.Norm.Norm`(Section 68.4)

`getType()`

Inherited from object

`__delattr__()`, `__getattr__()`, `__hash__()`, `__new__()`, `__reduce__()`, `__reduce_ex__()`,
`__repr__()`, `__setattr__()`, `__str__()`

46.2.2 Properties

Name	Description
<i>Inherited from object</i>	
<code>__class__</code>	

46.2.3 Class Variables

Name	Description
<i>Inherited from <code>fuzzy.norm.Norm.Norm</code> (Section 68.4)</i>	
<code>S_NORM</code> , <code>T_NORM</code> , <code>UNKNOWN</code>	

47 Module *fuzzy.norm.DrasticSum*

47.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: DrasticSum.py,v 1.4 2009/08/31 21:02:06 rliebscher ...

47.2 Class *DrasticSum*



47.2.1 Methods

`__init__(self)`

Initialize type of norm

Overrides: `object.__init__` `exitit`(inherited documentation)

`__call__(self, *args)`

Calculate result of `norm(arg1,arg2,...)`

Parameters

args: list of floats as arguments for norm.

Return Value

result of norm calculation

(*type=float*)

Raises

NormException any problem in calculation (wrong number of arguments, numerical problems)

Overrides: `fuzzy.norm.Norm.Norm.__call__` `exitit`(inherited documentation)

Inherited from `fuzzy.norm.Norm.Norm`(Section 68.4)

`getType()`

Inherited from object

`__delattr__()`, `__getattr__()`, `__hash__()`, `__new__()`, `__reduce__()`, `__reduce_ex__()`,
`__repr__()`, `__setattr__()`, `__str__()`

47.2.2 Properties

Name	Description
<i>Inherited from object</i>	
<code>__class__</code>	

47.2.3 Class Variables

Name	Description
<i>Inherited from <code>fuzzy.norm.Norm.Norm</code> (Section 68.4)</i>	
<code>S_NORM</code> , <code>T_NORM</code> , <code>UNKNOWN</code>	

48 Module *fuzzy.norm.DualOfGeometricMean*

48.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: DualOfGeometricMean.py,v 1.6 2009/08/07 07:19:19 rl...

48.2 Class *DualOfGeometricMean*



48.2.1 Methods

`__init__(self)`

Initialize type of norm

Overrides: `object.__init__` `exitit`(inherited documentation)

`__call__(self, *args)`

Calculate result of `norm(arg1,arg2,...)`

Parameters

args: list of floats as arguments for norm.

Return Value

result of norm calculation

(*type=float*)

Raises

NormException any problem in calculation (wrong number of arguments, numerical problems)

Overrides: `fuzzy.norm.Norm.Norm.__call__` `exitit`(inherited documentation)

Inherited from `fuzzy.norm.Norm.Norm`(Section 68.4)

`getType()`

Inherited from object

`__delattr__()`, `__getattr__()`, `__hash__()`, `__new__()`, `__reduce__()`, `__reduce_ex__()`,
`__repr__()`, `__setattr__()`, `__str__()`

48.2.2 Properties

Name	Description
<i>Inherited from object</i>	
<code>__class__</code>	

48.2.3 Class Variables

Name	Description
<i>Inherited from <code>fuzzy.norm.Norm.Norm</code> (Section 68.4)</i>	
<code>S_NORM</code> , <code>T_NORM</code> , <code>UNKNOWN</code>	

49 Module *fuzzy.norm.DualOfHarmonicMean*

49.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: DualOfHarmonicMean.py,v 1.4 2009/08/07 07:19:19 rli...

49.2 Class *DualOfHarmonicMean*



49.2.1 Methods

<code>__init__(self)</code> Initialize type of norm Overrides: <code>object.__init__</code> <code>exitit</code> (inherited documentation)
<code>__call__(self, *args)</code> Calculate result of <code>norm(arg1,arg2,...)</code> Parameters args: list of floats as arguments for <code>norm</code> . Return Value result of <code>norm</code> calculation (<i>type=float</i>) Raises NormException any problem in calculation (wrong number of arguments, numerical problems) Overrides: <code>fuzzy.norm.Norm.Norm.__call__</code> <code>exitit</code> (inherited documentation)

Inherited from `fuzzy.norm.Norm.Norm`(Section 68.4)

`getType()`

Inherited from object

`__delattr__()`, `__getattr__()`, `__hash__()`, `__new__()`, `__reduce__()`, `__reduce_ex__()`,
`__repr__()`, `__setattr__()`, `__str__()`

49.2.2 Properties

Name	Description
<i>Inherited from object</i>	
<code>__class__</code>	

49.2.3 Class Variables

Name	Description
<i>Inherited from <code>fuzzy.norm.Norm.Norm</code> (Section 68.4)</i>	
<code>S_NORM</code> , <code>T_NORM</code> , <code>UNKNOWN</code>	

50 Module `fuzzy.norm.DubiosPradeIntersection`

50.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: DubiosPradeIntersection.py,v 1.1 2009/08/31 21:06:4...

50.2 Class `DubiosPradeIntersection`

object └

fuzzy.norm.Norm.Norm └

fuzzy.norm.ParametricNorm.ParametricNorm └

fuzzy.norm.DubiosPradeIntersection.DubiosPradeIntersection

Dubios Prade 1980

50.2.1 Methods

`__init__(self, p=0.5)`

Initialize type and parameter

Parameters

p: parameter for norm

Overrides: object.`__init__` extit(inherited documentation)

```
--call--(self, *args)
```

Calculate result of norm(arg1,arg2,...)

Parameters

args: list of floats as arguments for norm.

Return Value

result of norm calculation

(*type=float*)

Raises

NormException any problem in calculation (wrong number of arguments, numerical problems)

Overrides: *fuzzy.norm.Norm.Norm.__call__* extit(inherited documentation)

Inherited from fuzzy.norm.Norm.Norm(Section 68.4)

getType()

Inherited from object

__delattr__(), *__getattr__()*, *__hash__()*, *__new__()*, *__reduce__()*, *__reduce_ex__()*,
__repr__(), *__setattr__()*, *__str__()*

50.2.2 Properties

Name	Description
<i>Inherited from fuzzy.norm.ParametricNorm.ParametricNorm (Section 69.2)</i>	
<i>p_range</i>	
<i>Inherited from object</i>	
<i>__class__</i>	

50.2.3 Class Variables

Name	Description
<i>Inherited from fuzzy.norm.Norm.Norm (Section 68.4)</i>	
<i>S_NORM</i> , <i>T_NORM</i> , <i>UNKNOWN</i>	

50.2.4 Instance Variables

Name	Description
<i>Inherited from fuzzy.norm.ParametricNorm.ParametricNorm (Section 69.2)</i>	
<i>p</i>	

51 Module `fuzzy.norm.DubiosPradeUnion`

51.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: DubiosPradeUnion.py,v 1.1 2009/08/31 21:06:40 rlieb...

51.2 Class `DubiosPradeUnion`

object 

fuzzy.norm.Norm.Norm 

fuzzy.norm.ParametricNorm.ParametricNorm 

`fuzzy.norm.DubiosPradeUnion.DubiosPradeUnion`

Dubios Prade 1980

51.2.1 Methods

```
__init__(self, p=0.5)
```

Initialize type and parameter

Parameters

p: parameter for norm

Overrides: `object.__init__` `extit`(inherited documentation)

```
--call--(self, *args)
```

Calculate result of norm(arg1,arg2,...)

Parameters

args: list of floats as arguments for norm.

Return Value

result of norm calculation

(*type=float*)

Raises

NormException any problem in calculation (wrong number of arguments, numerical problems)

Overrides: *fuzzy.norm.Norm.Norm.__call__* extit(inherited documentation)

Inherited from fuzzy.norm.Norm.Norm(Section 68.4)

getType()

Inherited from object

__delattr__(), *__getattr__()*, *__hash__()*, *__new__()*, *__reduce__()*, *__reduce_ex__()*,
__repr__(), *__setattr__()*, *__str__()*

51.2.2 Properties

Name	Description
<i>Inherited from fuzzy.norm.ParametricNorm.ParametricNorm (Section 69.2)</i>	
<i>p_range</i>	
<i>Inherited from object</i>	
<i>__class__</i>	

51.2.3 Class Variables

Name	Description
<i>Inherited from fuzzy.norm.Norm.Norm (Section 68.4)</i>	
<i>S_NORM</i> , <i>T_NORM</i> , <i>UNKNOWN</i>	

51.2.4 Instance Variables

Name	Description
<i>Inherited from fuzzy.norm.ParametricNorm.ParametricNorm (Section 69.2)</i>	
<i>p</i>	

52 Module *fuzzy.norm.EinsteinProduct*

52.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: EinsteinProduct.py,v 1.3 2009/08/07 07:19:19 rliebs...

52.2 Class *EinsteinProduct*



52.2.1 Methods

<code>__init__(self)</code> Initialize type of norm Overrides: <code>object.__init__</code> <code>exitit</code> (inherited documentation)
<code>__call__(self, *args)</code> Calculate result of <code>norm(arg1,arg2,...)</code> Parameters args: list of floats as arguments for <code>norm</code> . Return Value result of <code>norm</code> calculation (<i>type=float</i>) Raises NormException any problem in calculation (wrong number of arguments, numerical problems) Overrides: <code>fuzzy.norm.Norm.Norm.__call__</code> <code>exitit</code> (inherited documentation)

Inherited from `fuzzy.norm.Norm.Norm`(Section 68.4)

`getType()`

Inherited from object

`__delattr__()`, `__getattr__()`, `__hash__()`, `__new__()`, `__reduce__()`, `__reduce_ex__()`,
`__repr__()`, `__setattr__()`, `__str__()`

52.2.2 Properties

Name	Description
<i>Inherited from object</i>	
<code>__class__</code>	

52.2.3 Class Variables

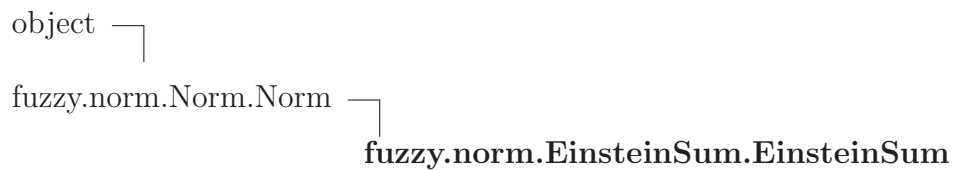
Name	Description
<i>Inherited from <code>fuzzy.norm.Norm.Norm</code> (Section 68.4)</i>	
<code>S_NORM</code> , <code>T_NORM</code> , <code>UNKNOWN</code>	

53 Module *fuzzy.norm.EinsteinSum*

53.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: EinsteinSum.py,v 1.3 2009/08/07 07:19:19 rliebscher...'

53.2 Class *EinsteinSum*



53.2.1 Methods

<code>__init__(self)</code> Initialize type of norm Overrides: <code>object.__init__</code> <code>exitit</code> (inherited documentation)
<code>__call__(self, *args)</code> Calculate result of <code>norm(arg1,arg2,...)</code> Parameters args: list of floats as arguments for <code>norm</code> . Return Value result of norm calculation (<i>type=float</i>) Raises NormException any problem in calculation (wrong number of arguments, numerical problems) Overrides: <code>fuzzy.norm.Norm.Norm.__call__</code> <code>exitit</code> (inherited documentation)

Inherited from `fuzzy.norm.Norm.Norm`(Section 68.4)

`getType()`

Inherited from object

`__delattr__()`, `__getattr__()`, `__hash__()`, `__new__()`, `__reduce__()`, `__reduce_ex__()`,
`__repr__()`, `__setattr__()`, `__str__()`

53.2.2 Properties

Name	Description
<i>Inherited from object</i>	
<code>__class__</code>	

53.2.3 Class Variables

Name	Description
<i>Inherited from <code>fuzzy.norm.Norm.Norm</code> (Section 68.4)</i>	
<code>S_NORM</code> , <code>T_NORM</code> , <code>UNKNOWN</code>	

54 Module `fuzzy.norm.FrankIntersection`

54.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: FrankIntersection.py,v 1.4 2009/08/31 21:02:06 rlie...

54.2 Class `FrankIntersection`

object

fuzzy.norm.Norm.Norm

fuzzy.norm.ParametricNorm.ParametricNorm

fuzzy.norm.FrankIntersection.FrankIntersection

Frank 1979

54.2.1 Methods

`__init__(self, p=0.5)`

Initialize type and parameter

Parameters

p: parameter for norm

Overrides: object.`__init__` extit(inherited documentation)

```
--call--(self, *args)
```

Calculate result of norm(arg1,arg2,...)

Parameters

args: list of floats as arguments for norm.

Return Value

result of norm calculation

(*type=float*)

Raises

NormException any problem in calculation (wrong number of arguments, numerical problems)

Overrides: fuzzy.norm.Norm.Norm.__call__ extit(inherited documentation)

Inherited from fuzzy.norm.Norm.Norm(Section 68.4)

getType()

Inherited from object

__delattr__(), __getattr__(), __hash__(), __new__(), __reduce__(), __reduce_ex__(),
__repr__(), __setattr__(), __str__()

54.2.2 Properties

Name	Description
<i>Inherited from fuzzy.norm.ParametricNorm.ParametricNorm (Section 69.2)</i>	
p_range	
<i>Inherited from object</i>	
__class__	

54.2.3 Class Variables

Name	Description
<i>Inherited from fuzzy.norm.Norm.Norm (Section 68.4)</i>	
S_NORM, T_NORM, UNKNOWN	

54.2.4 Instance Variables

Name	Description
<i>Inherited from fuzzy.norm.ParametricNorm.ParametricNorm (Section 69.2)</i>	
p	

55 Module fuzzy.norm.FrankUnion

55.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: FrankUnion.py,v 1.4 2009/09/24 20:32:20 rliebscher ...

55.2 Class FrankUnion

object └

fuzzy.norm.Norm.Norm └

fuzzy.norm.ParametricNorm.ParametricNorm └
 fuzzy.norm.FrankUnion.FrankUnion

Frank 1979

55.2.1 Methods

`__init__(self, p=0.5)`

Initialize type and parameter

Parameters

p: parameter for norm

Overrides: object.__init__ extit(inherited documentation)

```
--call--(self, *args)
```

Calculate result of norm(arg1,arg2,...)

Parameters

args: list of floats as arguments for norm.

Return Value

result of norm calculation

(*type=float*)

Raises

NormException any problem in calculation (wrong number of arguments, numerical problems)

Overrides: fuzzy.norm.Norm.Norm.__call__ exitit(inherited documentation)

Inherited from fuzzy.norm.Norm.Norm(Section 68.4)

getType()

Inherited from object

__delattr__(), __getattr__(), __hash__(), __new__(), __reduce__(), __reduce_ex__(),
__repr__(), __setattr__(), __str__()

55.2.2 Properties

Name	Description
<i>Inherited from fuzzy.norm.ParametricNorm.ParametricNorm (Section 69.2)</i>	
p_range	
<i>Inherited from object</i>	
__class__	

55.2.3 Class Variables

Name	Description
<i>Inherited from fuzzy.norm.Norm.Norm (Section 68.4)</i>	
S_NORM, T_NORM, UNKNOWN	

55.2.4 Instance Variables

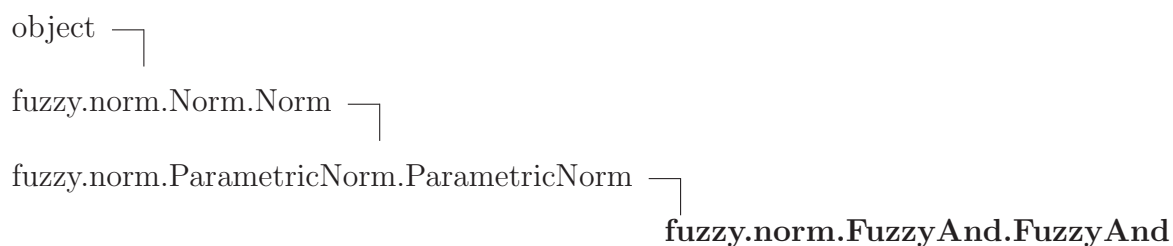
Name	Description
<i>Inherited from fuzzy.norm.ParametricNorm.ParametricNorm (Section 69.2)</i>	
p	

56 Module *fuzzy.norm.FuzzyAnd*

56.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: FuzzyAnd.py,v 1.4 2009/09/24 20:32:20 rliebscher Ex...

56.2 Class *FuzzyAnd*



56.2.1 Methods

`__init__(self, p=0.5)`

Initialize type and parameter

Parameters

`p`: parameter for norm

Overrides: `object.__init__` `extit`(inherited documentation)

```
--call--(self, *args)
```

Calculate result of norm(arg1,arg2,...)

Parameters

args: list of floats as arguments for norm.

Return Value

result of norm calculation

(*type=float*)

Raises

NormException any problem in calculation (wrong number of arguments, numerical problems)

Overrides: fuzzy.norm.Norm.Norm.__call__ exitit(inherited documentation)

Inherited from fuzzy.norm.Norm.Norm(Section 68.4)

getType()

Inherited from object

__delattr__(), __getattr__(), __hash__(), __new__(), __reduce__(), __reduce_ex__(),
__repr__(), __setattr__(), __str__()

56.2.2 Properties

Name	Description
<i>Inherited from fuzzy.norm.ParametricNorm.ParametricNorm (Section 69.2)</i>	
p_range	
<i>Inherited from object</i>	
__class__	

56.2.3 Class Variables

Name	Description
<i>Inherited from fuzzy.norm.Norm.Norm (Section 68.4)</i>	
S_NORM, T_NORM, UNKNOWN	

56.2.4 Instance Variables

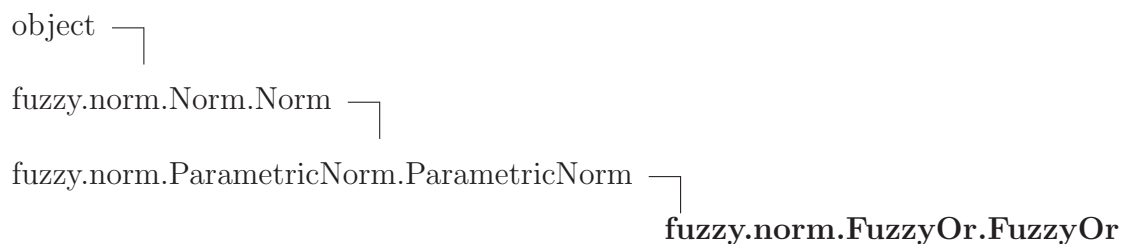
Name	Description
<i>Inherited from fuzzy.norm.ParametricNorm.ParametricNorm (Section 69.2)</i>	
p	

57 Module fuzzy.norm.FuzzyOr

57.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: FuzzyOr.py,v 1.4 2009/09/24 20:32:20 rliebscher Exp \$'

57.2 Class FuzzyOr



57.2.1 Methods

<code>__init__</code> (<i>self</i> , <i>p</i> =0.5) Initialize type and parameter Parameters <i>p</i> : parameter for norm Overrides: <code>object.__init__</code> extit(inherited documentation)
--

```
--call--(self, *args)
```

Calculate result of norm(arg1,arg2,...)

Parameters

args: list of floats as arguments for norm.

Return Value

result of norm calculation

(*type=float*)

Raises

NormException any problem in calculation (wrong number of arguments, numerical problems)

Overrides: fuzzy.norm.Norm.Norm.__call__ exitit(inherited documentation)

Inherited from fuzzy.norm.Norm.Norm(Section 68.4)

getType()

Inherited from object

__delattr__(), __getattr__(), __hash__(), __new__(), __reduce__(), __reduce_ex__(),
__repr__(), __setattr__(), __str__()

57.2.2 Properties

Name	Description
<i>Inherited from fuzzy.norm.ParametricNorm.ParametricNorm (Section 69.2)</i>	
p_range	
<i>Inherited from object</i>	
__class__	

57.2.3 Class Variables

Name	Description
<i>Inherited from fuzzy.norm.Norm.Norm (Section 68.4)</i>	
S_NORM, T_NORM, UNKNOWN	

57.2.4 Instance Variables

Name	Description
<i>Inherited from fuzzy.norm.ParametricNorm.ParametricNorm (Section 69.2)</i>	
p	

58 Module `fuzzy.norm.GammaOperator`

58.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: GammaOperator.py,v 1.6 2009/09/24 20:32:20 rliebsch...'

58.2 Class `GammaOperator`

object └

fuzzy.norm.Norm.Norm └

fuzzy.norm.ParametricNorm.ParametricNorm └
 fuzzy.norm.GammaOperator.GammaOperator

58.2.1 Methods

```
__init__(self, p=0.5)
```

Initialize type and parameter

Parameters

`p`: parameter for norm

Overrides: object.__init__ extit(inherited documentation)

```
--call--(self, *args)
```

Calculate result of norm(arg1,arg2,...)

Parameters

args: list of floats as arguments for norm.

Return Value

result of norm calculation

(*type=float*)

Raises

NormException any problem in calculation (wrong number of arguments, numerical problems)

Overrides: *fuzzy.norm.Norm.Norm.__call__* extit(inherited documentation)

Inherited from fuzzy.norm.Norm.Norm(Section 68.4)

getType()

Inherited from object

__delattr__(), *__getattr__()*, *__hash__()*, *__new__()*, *__reduce__()*, *__reduce_ex__()*,
__repr__(), *__setattr__()*, *__str__()*

58.2.2 Properties

Name	Description
<i>Inherited from fuzzy.norm.ParametricNorm.ParametricNorm (Section 69.2)</i>	
<i>p_range</i>	
<i>Inherited from object</i>	
<i>__class__</i>	

58.2.3 Class Variables

Name	Description
<i>Inherited from fuzzy.norm.Norm.Norm (Section 68.4)</i>	
S_NORM, T_NORM, UNKNOWN	

58.2.4 Instance Variables

Name	Description
<i>Inherited from fuzzy.norm.ParametricNorm.ParametricNorm (Section 69.2)</i>	
<i>p</i>	

59 Module *fuzzy.norm.GeometricMean*

59.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: GeometricMean.py,v 1.4 2009/08/07 07:19:19 rliebsch...'

59.2 Class *GeometricMean*



59.2.1 Methods

`__init__(self)`

Initialize type of norm

Overrides: `object.__init__` `exitit`(inherited documentation)

`__call__(self, *args)`

Calculate result of `norm(arg1,arg2,...)`

Parameters

args: list of floats as arguments for norm.

Return Value

result of norm calculation

(*type=float*)

Raises

NormException any problem in calculation (wrong number of arguments, numerical problems)

Overrides: `fuzzy.norm.Norm.Norm.__call__` `exitit`(inherited documentation)

Inherited from `fuzzy.norm.Norm.Norm`(Section 68.4)

`getType()`

Inherited from object

`__delattr__()`, `__getattr__()`, `__hash__()`, `__new__()`, `__reduce__()`, `__reduce_ex__()`,
`__repr__()`, `__setattr__()`, `__str__()`

59.2.2 Properties

Name	Description
<i>Inherited from object</i>	
<code>__class__</code>	

59.2.3 Class Variables

Name	Description
<i>Inherited from <code>fuzzy.norm.Norm.Norm</code> (Section 68.4)</i>	
<code>S_NORM</code> , <code>T_NORM</code> , <code>UNKNOWN</code>	

60 Module `fuzzy.norm.HamacherIntersection`

60.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: HamacherIntersection.py,v 1.5 2009/10/18 19:46:59 r...

60.2 Class `HamacherIntersection`

object └

fuzzy.norm.Norm.Norm └

fuzzy.norm.ParametricNorm.ParametricNorm └

fuzzy.norm.HamacherIntersection.HamacherInter

Hamacher 1978

60.2.1 Methods

```
__init__(self, p=1.0)
```

Initialize type and parameter

Parameters

p: parameter for norm

Overrides: object.`__init__` extit(inherited documentation)

```
--call--(self, *args)
```

Calculate result of norm(arg1,arg2,...)

Parameters

args: list of floats as arguments for norm.

Return Value

result of norm calculation

(*type=float*)

Raises

NormException any problem in calculation (wrong number of arguments, numerical problems)

Overrides: *fuzzy.norm.Norm.Norm.__call__* extit(inherited documentation)

Inherited from fuzzy.norm.Norm.Norm(Section 68.4)

getType()

Inherited from object

__delattr__(), *__getattr__()*, *__hash__()*, *__new__()*, *__reduce__()*, *__reduce_ex__()*,
__repr__(), *__setattr__()*, *__str__()*

60.2.2 Properties

Name	Description
<i>Inherited from fuzzy.norm.ParametricNorm.ParametricNorm (Section 69.2)</i>	
<i>p_range</i>	
<i>Inherited from object</i>	
<i>__class__</i>	

60.2.3 Class Variables

Name	Description
<i>Inherited from fuzzy.norm.Norm.Norm (Section 68.4)</i>	
S_NORM, T_NORM, UNKNOWN	

60.2.4 Instance Variables

Name	Description
<i>Inherited from fuzzy.norm.ParametricNorm.ParametricNorm (Section 69.2)</i>	
<i>p</i>	

61 Module fuzzy.norm.HamacherProduct

61.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: HamacherProduct.py,v 1.4 2009/08/07 07:19:19 rliebs...

61.2 Class HamacherProduct



61.2.1 Methods

<code>__init__(self)</code> Initialize type of norm Overrides: <code>object.__init__</code> <code>exitit</code> (inherited documentation)
<code>__call__(self, *args)</code> Calculate result of norm(arg1,arg2,...) Parameters args: list of floats as arguments for norm. Return Value result of norm calulation (<i>type=float</i>) Raises NormException any problem in calculation (wrong number of arguments, numerical problems) Overrides: <code>fuzzy.norm.Norm.Norm.__call__</code> <code>exitit</code> (inherited documentation)

Inherited from fuzzy.norm.Norm.Norm(Section 68.4)

`getType()`

Inherited from object

`__delattr__()`, `__getattr__()`, `__hash__()`, `__new__()`, `__reduce__()`, `__reduce_ex__()`,
`__repr__()`, `__setattr__()`, `__str__()`

61.2.2 Properties

Name	Description
<i>Inherited from object</i>	
<code>__class__</code>	

61.2.3 Class Variables

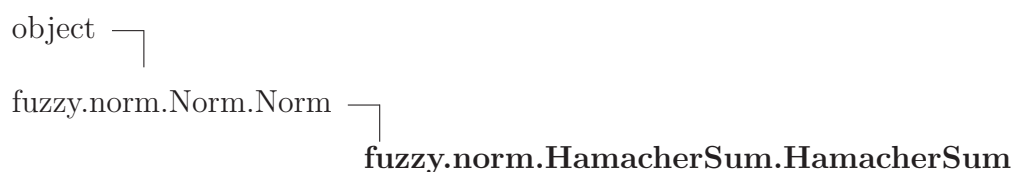
Name	Description
<i>Inherited from fuzzy.norm.Norm.Norm (Section 68.4)</i>	
<code>S_NORM</code> , <code>T_NORM</code> , <code>UNKNOWN</code>	

62 Module *fuzzy.norm.HamacherSum*

62.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: HamacherSum.py,v 1.4 2009/08/07 07:19:19 rliebscher...'

62.2 Class *HamacherSum*



62.2.1 Methods

<code>__init__(self)</code> Initialize type of norm Overrides: <code>object.__init__</code> <code>exitit</code> (inherited documentation)
<code>__call__(self, *args)</code> Calculate result of <code>norm(arg1,arg2,...)</code> Parameters args: list of floats as arguments for <code>norm</code> . Return Value result of <code>norm</code> calculation (<i>type=float</i>) Raises NormException any problem in calculation (wrong number of arguments, numerical problems) Overrides: <code>fuzzy.norm.Norm.Norm.__call__</code> <code>exitit</code> (inherited documentation)

Inherited from `fuzzy.norm.Norm.Norm`(Section 68.4)

`getType()`

Inherited from object

`__delattr__()`, `__getattr__()`, `__hash__()`, `__new__()`, `__reduce__()`, `__reduce_ex__()`,
`__repr__()`, `__setattr__()`, `__str__()`

62.2.2 Properties

Name	Description
<i>Inherited from object</i>	
<code>__class__</code>	

62.2.3 Class Variables

Name	Description
<i>Inherited from fuzzy.norm.Norm.Norm (Section 68.4)</i>	
<code>S_NORM</code> , <code>T_NORM</code> , <code>UNKNOWN</code>	

63 Module `fuzzy.norm.HamacherUnion`

63.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: HamacherUnion.py,v 1.5 2009/10/18 19:46:59 rliebsch...

63.2 Class `HamacherUnion`

object └

fuzzy.norm.Norm.Norm └

fuzzy.norm.ParametricNorm.ParametricNorm └
 fuzzy.norm.HamacherUnion.HamacherUnion

Hamacher 1978

63.2.1 Methods

```
__init__(self, p=1.0)
```

Initialize type and parameter

Parameters

p: parameter for norm

Overrides: `object.__init__` extit(inherited documentation)

```
--call--(self, *args)
```

Calculate result of norm(arg1,arg2,...)

Parameters

args: list of floats as arguments for norm.

Return Value

result of norm calculation

(*type=float*)

Raises

NormException any problem in calculation (wrong number of arguments, numerical problems)

Overrides: fuzzy.norm.Norm.Norm.__call__ exitit(inherited documentation)

Inherited from fuzzy.norm.Norm.Norm(Section 68.4)

getType()

Inherited from object

__delattr__(), __getattr__(), __hash__(), __new__(), __reduce__(), __reduce_ex__(),
__repr__(), __setattr__(), __str__()

63.2.2 Properties

Name	Description
<i>Inherited from fuzzy.norm.ParametricNorm.ParametricNorm (Section 69.2)</i>	
p_range	
<i>Inherited from object</i>	
__class__	

63.2.3 Class Variables

Name	Description
<i>Inherited from fuzzy.norm.Norm.Norm (Section 68.4)</i>	
S_NORM, T_NORM, UNKNOWN	

63.2.4 Instance Variables

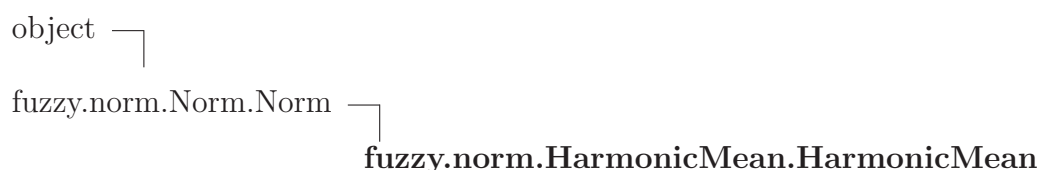
Name	Description
<i>Inherited from fuzzy.norm.ParametricNorm.ParametricNorm (Section 69.2)</i>	
p	

64 Module *fuzzy.norm.HarmonicMean*

64.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: HarmonicMean.py,v 1.5 2009/08/07 07:19:19 rliebsche...'

64.2 Class *HarmonicMean*



64.2.1 Methods

<code>__init__(self)</code> Initialize type of norm Overrides: <code>object.__init__</code> <code>exitit</code> (inherited documentation)
<code>__call__(self, *args)</code> Calculate result of <code>norm(arg1,arg2,...)</code> Parameters args: list of floats as arguments for norm. Return Value result of norm calculation (<i>type=float</i>) Raises NormException any problem in calculation (wrong number of arguments, numerical problems) Overrides: <code>fuzzy.norm.Norm.Norm.__call__</code> <code>exitit</code> (inherited documentation)

Inherited from `fuzzy.norm.Norm.Norm`(Section 68.4)

`getType()`

Inherited from object

`__delattr__()`, `__getattr__()`, `__hash__()`, `__new__()`, `__reduce__()`, `__reduce_ex__()`,
`__repr__()`, `__setattr__()`, `__str__()`

64.2.2 Properties

Name	Description
<i>Inherited from object</i>	
<code>__class__</code>	

64.2.3 Class Variables

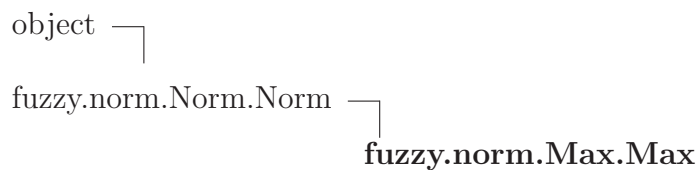
Name	Description
<i>Inherited from <code>fuzzy.norm.Norm.Norm</code> (Section 68.4)</i>	
<code>S_NORM</code> , <code>T_NORM</code> , <code>UNKNOWN</code>	

65 Module fuzzy.norm.Max

65.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: Max.py,v 1.5 2009/08/07 07:19:19 rliebscher Exp \$'

65.2 Class Max



65.2.1 Methods

<code>__init__(self)</code> Initialize type of norm Overrides: <code>object.__init__</code> extit(inherited documentation)
<code>__call__(self, *args)</code> Return maximum of given values. Parameters <code>args</code> : list of floats as arguments for norm. Return Value result of norm calculation (<i>type=float</i>) Raises NormException any problem in calculation (wrong number of arguments, numerical problems) Overrides: <code>fuzzy.norm.Norm.Norm.__call__</code>

Inherited from fuzzy.norm.Norm.Norm(Section 68.4)

`getType()`

Inherited from object

`__delattr__()`, `__getattr__()`, `__hash__()`, `__new__()`, `__reduce__()`, `__reduce_ex__()`,
`__repr__()`, `__setattr__()`, `__str__()`

65.2.2 Properties

Name	Description
<i>Inherited from object</i>	
<code>__class__</code>	

65.2.3 Class Variables

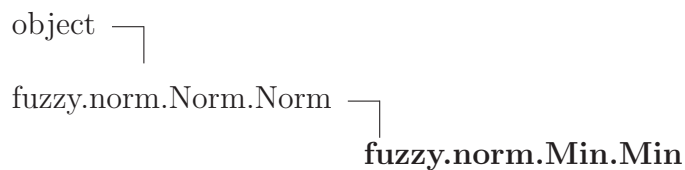
Name	Description
<i>Inherited from <code>fuzzy.norm.Norm.Norm</code> (Section 68.4)</i>	
<code>S_NORM</code> , <code>T_NORM</code> , <code>UNKNOWN</code>	

66 Module fuzzy.norm.Min

66.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: Min.py,v 1.5 2009/08/07 07:19:19 rliebscher Exp \$'

66.2 Class Min



66.2.1 Methods

<code>__init__(self)</code> Initialize type of norm Overrides: <code>object.__init__</code> extit(inherited documentation)
<code>__call__(self, *args)</code> Return minimum of given values. Parameters <code>args</code> : list of floats as arguments for norm. Return Value result of norm calculation (<i>type=float</i>) Raises NormException any problem in calculation (wrong number of arguments, numerical problems) Overrides: <code>fuzzy.norm.Norm.Norm.__call__</code>

Inherited from fuzzy.norm.Norm.Norm(Section 68.4)

`getType()`

Inherited from object

`__delattr__()`, `__getattr__()`, `__hash__()`, `__new__()`, `__reduce__()`, `__reduce_ex__()`,
`__repr__()`, `__setattr__()`, `__str__()`

66.2.2 Properties

Name	Description
<i>Inherited from object</i>	
<code>__class__</code>	

66.2.3 Class Variables

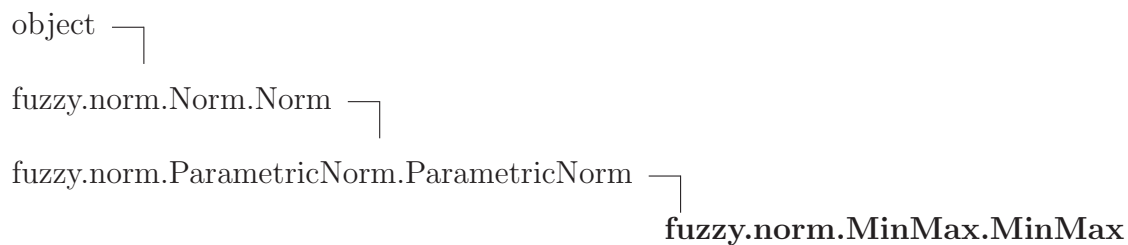
Name	Description
<i>Inherited from <code>fuzzy.norm.Norm.Norm</code> (Section 68.4)</i>	
<code>S_NORM</code> , <code>T_NORM</code> , <code>UNKNOWN</code>	

67 Module fuzzy.norm.MinMax

67.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: MinMax.py,v 1.4 2009/09/24 20:32:20 rliebscher Exp \$'

67.2 Class MinMax



67.2.1 Methods

__init__(*self*, *p*=0.5)

Initialize type and parameter

Parameters

p: parameter for norm

Overrides: `object.__init__` extit(inherited documentation)

__call__(*self*, **args*)

Calculate result of norm(*arg1*,*arg2*,...)

Parameters

args: list of floats as arguments for norm.

Return Value

result of norm calculation

(*type*=float)

Raises

`NormException` any problem in calculation (wrong number of arguments, numerical problems)

Overrides: `fuzzy.norm.Norm.Norm.__call__` extit(inherited documentation)

Inherited from fuzzy.norm.Norm.Norm (Section 68.4)

getType()

Inherited from object

__delattr__(), __getattr__(), __hash__(), __new__(), __reduce__(), __reduce_ex__(),
 __repr__(), __setattr__(), __str__()

67.2.2 Properties

Name	Description
<i>Inherited from fuzzy.norm.ParametricNorm.ParametricNorm (Section 69.2)</i> p_range	
<i>Inherited from object</i> __class__	

67.2.3 Class Variables

Name	Description
<i>Inherited from fuzzy.norm.Norm.Norm (Section 68.4)</i> S_NORM, T_NORM, UNKNOWN	

67.2.4 Instance Variables

Name	Description
<i>Inherited from fuzzy.norm.ParametricNorm.ParametricNorm (Section 69.2)</i> p	

68 Module `fuzzy.norm.Norm`

Abstract base class for any kind of fuzzy norm.

68.1 Functions

product(*args)

Calculate product of args.

Parameters

args: list of floats to multiply
(type=list of float)

Return Value

product of args
(type=float)

sum(*args)

Calculate sum of args.

If using numpy the builtin sum doesn't work always!

Parameters

args: list of floats to sum
(type=list of float)

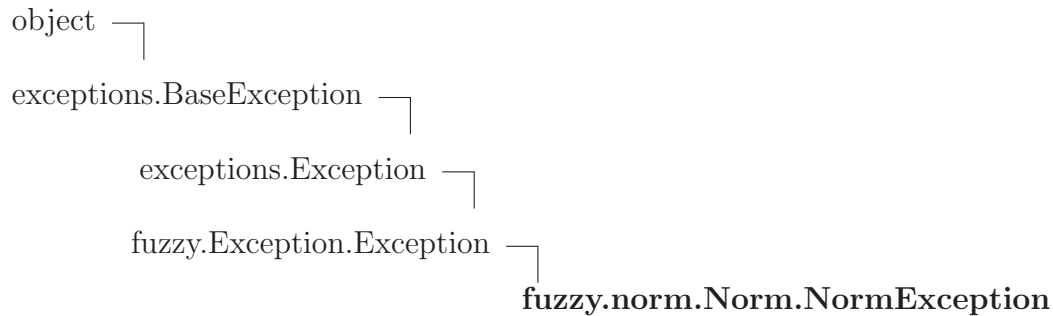
Return Value

sum of args
(type=float)

68.2 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: Norm.py,v 1.11 2009/08/07 07:19:19 rliebscher Exp \$'

68.3 Class NormException



Base class for any exception in norm calculations.

68.3.1 Methods

Inherited from exceptions.Exception

`__init__()`, `__new__()`

Inherited from exceptions.BaseException

`__delattr__()`, `__getattr__()`, `__getitem__()`, `__getslice__()`, `__reduce__()`, `__repr__()`,
`__setattr__()`, `__setstate__()`, `__str__()`

Inherited from object

`__hash__()`, `__reduce_ex__()`

68.3.2 Properties

Name	Description
<i>Inherited from exceptions.BaseException</i>	
args, message	
<i>Inherited from object</i>	
<code>__class__</code>	

68.4 Class Norm



Known Subclasses: `fuzzy.norm.DrasticProduct.DrasticProduct`, `fuzzy.norm.ParametricNorm.ParametricNorm`

fuzzy.norm.AlgebraicProduct.AlgebraicProduct, fuzzy.norm.GeometricMean.GeometricMean,
 fuzzy.norm.BoundedSum.BoundedSum, fuzzy.norm.BoundedDifference.BoundedDifference, fuzzy.norm.Dra
 fuzzy.norm.EinsteinProduct.EinsteinProduct, fuzzy.norm.Max.Max, fuzzy.norm.DualOfGeometricMean.D
 fuzzy.norm.AlgebraicSum.AlgebraicSum, fuzzy.norm.ArithmeticMean.ArithmeticMean, fuzzy.norm.Harmo
 fuzzy.norm.EinsteinSum.EinsteinSum, fuzzy.norm.Min.Min, fuzzy.norm.HamacherProduct.HamacherPro
 fuzzy.norm.DualOfHarmonicMean.DualOfHarmonicMean, fuzzy.norm.HamacherSum.HamacherSum

Abstract Base class of any fuzzy norm

68.4.1 Methods

<code>__init__(self, type=0)</code>
Initialize type of norm Overrides: <code>object.__init__</code>
<code>__call__(self, *args)</code>
Calculate result of norm(arg1,arg2,...) Parameters args : list of floats as arguments for norm. (<i>type=list of float</i>) Return Value result of norm calulation (<i>type=float</i>) Raises NormException any problem in calculation (wrong number of arguments, numerical problems)
<code>getType(self)</code>
Return type of norm: 0 = not defined or not classified 1 = t-norm (= Norm.T_NORM) 2 = s-norm (= Norm.S_NORM)

Inherited from object

`__delattr__()`, `__getattr__()`, `__hash__()`, `__new__()`, `__reduce__()`, `__reduce_ex__()`,
`__repr__()`, `__setattr__()`, `__str__()`

68.4.2 Properties

continued on next page

Name	Description
<i>Inherited from object</i>	
<code>__class__</code>	

68.4.3 Class Variables

Name	Description
UNKNOWN	type of norm unknown Value: 0
T_NORM	norm is t-norm Value: 1
S_NORM	norm is s-norm Value: 2

69 Module `fuzzy.norm.ParametricNorm`

Base class for any kind of parametric fuzzy norm.

69.1 Variables

Name	Description
<code>--revision--</code>	Value: <code>'\$Id: ParametricNorm.py,v 1.8 2009/10/07 21:08:14 rliebsc...</code>

69.2 Class `ParametricNorm`



Known Subclasses: `fuzzy.norm.FuzzyAnd.FuzzyAnd`, `fuzzy.norm.HamacherIntersection.HamacherIntersection`, `fuzzy.norm.SchweizerUnion.SchweizerUnion`, `fuzzy.norm.SchweizerIntersection.SchweizerIntersection`, `fuzzy.norm.DubiosPradeUnion.DubiosPradeUnion`, `fuzzy.norm.YagerIntersection.YagerIntersection`, `fuzzy.norm.FrankIntersection.FrankIntersection`, `fuzzy.norm.AlgebraicProdSum.AlgebraicProdSum`, `fuzzy.norm.FrankUnion.FrankUnion`, `fuzzy.norm.DombiIntersection.DombiIntersection`, `fuzzy.norm.MinMaxIntersection.MinMaxIntersection`, `fuzzy.norm.FuzzyOr.FuzzyOr`, `fuzzy.norm.DubiosPradeIntersection.DubiosPradeIntersection`, `fuzzy.norm.SchweizerIntersection3.SchweizerIntersection3`, `fuzzy.norm.SchweizerIntersection2.SchweizerIntersection2`, `fuzzy.norm.GammaOperator.GammaOperator`, `fuzzy.norm.DombiUnion.DombiUnion`, `fuzzy.norm.SchweizerUnion3.SchweizerUnion3`, `fuzzy.norm.YagerUnion.YagerUnion`, `fuzzy.norm.HamacherIntersection.HamacherIntersection`

Abstract base class for any parametric fuzzy norm

69.2.1 Methods

<code>--init--(self, type, p)</code>
Initialize type and parameter
Parameters
<p><code>p</code>: parameter for norm (<i>type=float</i>)</p>
Overrides: <code>object.__init__</code>

Inherited from `fuzzy.norm.Norm.Norm`(Section 68.4)

`__call__()`, `getType()`

Inherited from object

`__delattr__()`, `__getattr__()`, `__hash__()`, `__new__()`, `__reduce__()`, `__reduce_ex__()`,
`__repr__()`, `__setattr__()`, `__str__()`

69.2.2 Properties

Name	Description
<code>p_range</code>	range(s) of valid values for p
<i>Inherited from object</i>	
<code>__class__</code>	

69.2.3 Class Variables

Name	Description
<i>Inherited from fuzzy.norm.Norm.Norm (Section 68.4)</i>	
S_NORM, T_NORM, UNKNOWN	

69.2.4 Instance Variables

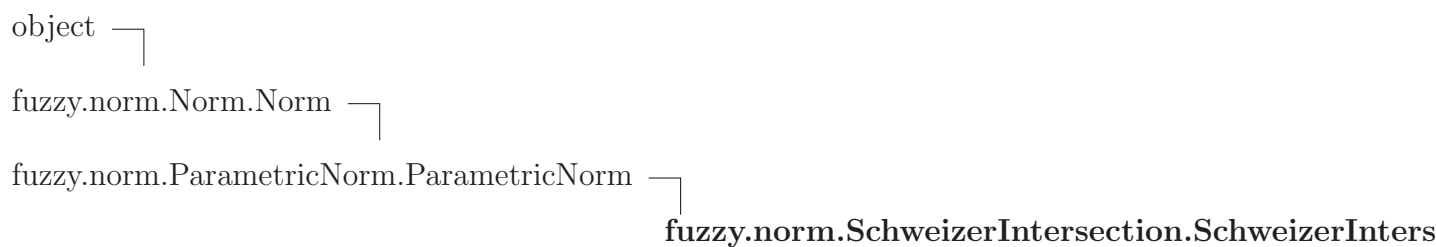
Name	Description
p	x (<i>type=float</i>)

70 Module `fuzzy.norm.SchweizerIntersection`

70.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: SchweizerIntersection.py,v 1.5 2009/10/18 19:46:59 ...

70.2 Class `SchweizerIntersection`



70.2.1 Methods

__init__(*self*, *p*=1.0)

Initialize type and parameter

Parameters

p: parameter for norm

Overrides: `object.__init__` `exitit`(inherited documentation)

__call__(*self*, **args*)

Calculate result of `norm(arg1,arg2,...)`

Parameters

args: list of floats as arguments for norm.

Return Value

result of norm calculation

(*type=float*)

Raises

`NormException` any problem in calculation (wrong number of arguments, numerical problems)

Overrides: `fuzzy.norm.Norm.Norm.__call__` `exitit`(inherited documentation)

Inherited from fuzzy.norm.Norm.Norm (Section 68.4)

getType()

Inherited from object

__delattr__(), __getattr__(), __hash__(), __new__(), __reduce__(), __reduce_ex__(),
__repr__(), __setattr__(), __str__()

70.2.2 Properties

Name	Description
<i>Inherited from fuzzy.norm.ParametricNorm.ParametricNorm (Section 69.2)</i> p_range	
<i>Inherited from object</i> __class__	

70.2.3 Class Variables

Name	Description
<i>Inherited from fuzzy.norm.Norm.Norm (Section 68.4)</i> S_NORM, T_NORM, UNKNOWN	

70.2.4 Instance Variables

Name	Description
<i>Inherited from fuzzy.norm.ParametricNorm.ParametricNorm (Section 69.2)</i> p	

71 Module `fuzzy.norm.SchweizerIntersection2`

71.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: SchweizerIntersection2.py,v 1.6 2009/10/18 19:46:59...

71.2 Class `SchweizerIntersection2`

object └

fuzzy.norm.Norm.Norm └

fuzzy.norm.ParametricNorm.ParametricNorm └

fuzzy.norm.SchweizerIntersection2.SchweizerInter

Schweizer,Sklar 1960

71.2.1 Methods

`__init__(self, p=1.0)`

Initialize type and parameter

Parameters

p: parameter for norm

Overrides: object.`__init__` extit(inherited documentation)

```
__call__(self, *args)
```

Calculate result of norm(arg1,arg2,...)

Parameters

args: list of floats as arguments for norm.

Return Value

result of norm calculation

(*type=float*)

Raises

NormException any problem in calculation (wrong number of arguments, numerical problems)

Overrides: *fuzzy.norm.Norm.Norm.__call__* extit(inherited documentation)

Inherited from fuzzy.norm.Norm.Norm(Section 68.4)

getType()

Inherited from object

__delattr__(), *__getattr__()*, *__hash__()*, *__new__()*, *__reduce__()*, *__reduce_ex__()*,
__repr__(), *__setattr__()*, *__str__()*

71.2.2 Properties

Name	Description
<i>Inherited from fuzzy.norm.ParametricNorm.ParametricNorm (Section 69.2)</i>	
<i>p_range</i>	
<i>Inherited from object</i>	
<i>__class__</i>	

71.2.3 Class Variables

Name	Description
<i>Inherited from fuzzy.norm.Norm.Norm (Section 68.4)</i>	
S_NORM, T_NORM, UNKNOWN	

71.2.4 Instance Variables

Name	Description
<i>Inherited from fuzzy.norm.ParametricNorm.ParametricNorm (Section 69.2)</i>	
<i>p</i>	

72 Module `fuzzy.norm.SchweizerIntersection3`

72.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: SchweizerIntersection3.py,v 1.5 2009/10/18 19:46:59...

72.2 Class `SchweizerIntersection3`

object └

fuzzy.norm.Norm.Norm └

fuzzy.norm.ParametricNorm.ParametricNorm └
fuzzy.norm.SchweizerIntersection3.SchweizerInter

72.2.1 Methods

```
__init__(self, p=1.0)
```

Initialize type and parameter

Parameters

`p`: parameter for norm

Overrides: object.__init__ extit(inherited documentation)

```
--call--(self, *args)
```

Calculate result of norm(arg1,arg2,...)

Parameters

args: list of floats as arguments for norm.

Return Value

result of norm calculation

(*type=float*)

Raises

NormException any problem in calculation (wrong number of arguments, numerical problems)

Overrides: *fuzzy.norm.Norm.Norm.__call__* extit(inherited documentation)

Inherited from fuzzy.norm.Norm.Norm(Section 68.4)

getType()

Inherited from object

__delattr__(), *__getattr__()*, *__hash__()*, *__new__()*, *__reduce__()*, *__reduce_ex__()*,
__repr__(), *__setattr__()*, *__str__()*

72.2.2 Properties

Name	Description
<i>Inherited from fuzzy.norm.ParametricNorm.ParametricNorm (Section 69.2)</i> <i>p_range</i>	
<i>Inherited from object</i> <i>__class__</i>	

72.2.3 Class Variables

Name	Description
<i>Inherited from fuzzy.norm.Norm.Norm (Section 68.4)</i> <i>S_NORM</i> , <i>T_NORM</i> , <i>UNKNOWN</i>	

72.2.4 Instance Variables

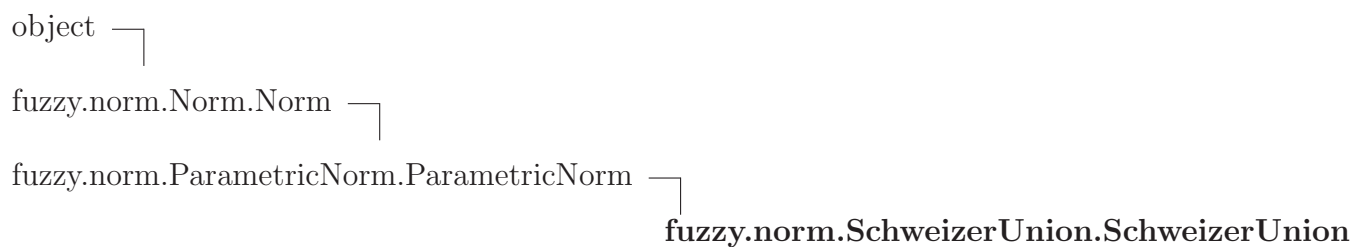
Name	Description
<i>Inherited from fuzzy.norm.ParametricNorm.ParametricNorm (Section 69.2)</i> <i>p</i>	

73 Module `fuzzy.norm.SchweizerUnion`

73.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: SchweizerUnion.py,v 1.5 2009/10/18 19:46:59 rliebsc...

73.2 Class `SchweizerUnion`



73.2.1 Methods

`__init__`(*self*, *p*=1.0)
 Initialize type and parameter
Parameters
 p: parameter for norm
 Overrides: `object.__init__` extit(inherited documentation)

`__call__`(*self*, **args*)
 Calculate result of `norm(arg1,arg2,...)`
Parameters
 args: list of floats as arguments for norm.
Return Value
 result of norm calculation
 (*type=float*)
Raises
 `NormException` any problem in calculation (wrong number of arguments, numerical problems)
 Overrides: `fuzzy.norm.Norm.Norm.__call__` extit(inherited documentation)

Inherited from fuzzy.norm.Norm.Norm (Section 68.4)

getType()

Inherited from object

__delattr__(), __getattr__(), __hash__(), __new__(), __reduce__(), __reduce_ex__(),
 __repr__(), __setattr__(), __str__()

73.2.2 Properties

Name	Description
<i>Inherited from fuzzy.norm.ParametricNorm.ParametricNorm (Section 69.2)</i> p_range	
<i>Inherited from object</i> __class__	

73.2.3 Class Variables

Name	Description
<i>Inherited from fuzzy.norm.Norm.Norm (Section 68.4)</i> S_NORM, T_NORM, UNKNOWN	

73.2.4 Instance Variables

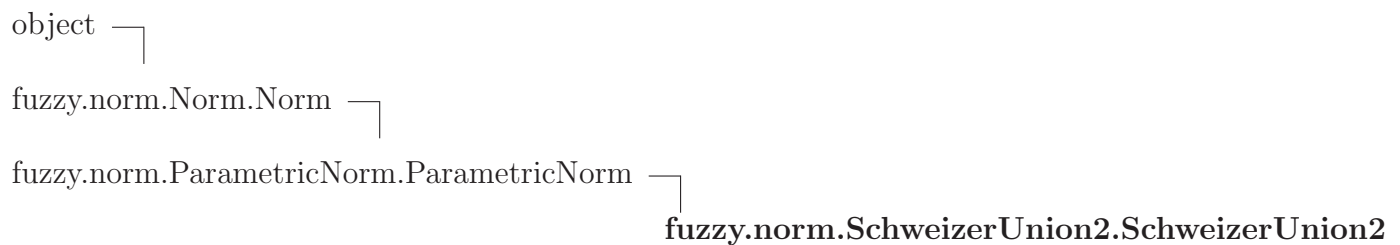
Name	Description
<i>Inherited from fuzzy.norm.ParametricNorm.ParametricNorm (Section 69.2)</i> p	

74 Module `fuzzy.norm.SchweizerUnion2`

74.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: SchweizerUnion2.py,v 1.5 2009/10/18 19:46:59 rliebs...

74.2 Class `SchweizerUnion2`



74.2.1 Methods

`__init__(self, p=1.0)`

Initialize type and parameter

Parameters

p: parameter for norm

Overrides: `object.__init__` `exitit`(inherited documentation)

`__call__(self, *args)`

Calculate result of `norm(arg1,arg2,...)`

Parameters

args: list of floats as arguments for norm.

Return Value

result of norm calculation

(*type=float*)

Raises

NormException any problem in calculation (wrong number of arguments, numerical problems)

Overrides: `fuzzy.norm.Norm.Norm.__call__` `exitit`(inherited documentation)

Inherited from fuzzy.norm.Norm.Norm (Section 68.4)

getType()

Inherited from object

__delattr__(), __getattr__(), __hash__(), __new__(), __reduce__(), __reduce_ex__(),
__repr__(), __setattr__(), __str__()

74.2.2 Properties

Name	Description
<i>Inherited from fuzzy.norm.ParametricNorm.ParametricNorm (Section 69.2)</i> p_range	
<i>Inherited from object</i> __class__	

74.2.3 Class Variables

Name	Description
<i>Inherited from fuzzy.norm.Norm.Norm (Section 68.4)</i> S_NORM, T_NORM, UNKNOWN	

74.2.4 Instance Variables

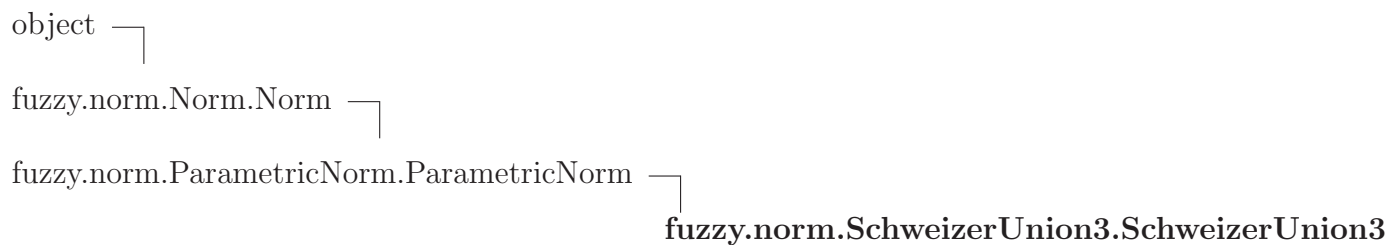
Name	Description
<i>Inherited from fuzzy.norm.ParametricNorm.ParametricNorm (Section 69.2)</i> p	

75 Module `fuzzy.norm.SchweizerUnion3`

75.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: SchweizerUnion3.py,v 1.4 2009/10/18 19:46:59 rliebs...

75.2 Class `SchweizerUnion3`



75.2.1 Methods

`__init__(self, p=1.0)`

Initialize type and parameter

Parameters

p: parameter for norm

Overrides: `object.__init__` `exitit`(inherited documentation)

`__call__(self, *args)`

Calculate result of `norm(arg1,arg2,...)`

Parameters

args: list of floats as arguments for norm.

Return Value

result of norm calculation

(*type=float*)

Raises

NormException any problem in calculation (wrong number of arguments, numerical problems)

Overrides: `fuzzy.norm.Norm.Norm.__call__` `exitit`(inherited documentation)

Inherited from fuzzy.norm.Norm.Norm (Section 68.4)

getType()

Inherited from object

__delattr__(), __getattr__(), __hash__(), __new__(), __reduce__(), __reduce_ex__(),
 __repr__(), __setattr__(), __str__()

75.2.2 Properties

Name	Description
<i>Inherited from fuzzy.norm.ParametricNorm.ParametricNorm (Section 69.2)</i> p_range	
<i>Inherited from object</i> __class__	

75.2.3 Class Variables

Name	Description
<i>Inherited from fuzzy.norm.Norm.Norm (Section 68.4)</i> S_NORM, T_NORM, UNKNOWN	

75.2.4 Instance Variables

Name	Description
<i>Inherited from fuzzy.norm.ParametricNorm.ParametricNorm (Section 69.2)</i> p	

76 Module `fuzzy.norm.YagerIntersection`

76.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: YagerIntersection.py,v 1.5 2009/09/24 20:32:20 rlie...

76.2 Class `YagerIntersection`

object └

fuzzy.norm.Norm.Norm └

fuzzy.norm.ParametricNorm.ParametricNorm └ **fuzzy.norm.YagerIntersection.YagerIntersection**

Yager 1980

76.2.1 Methods

`__init__(self, p=1.0)`

Initialize type and parameter

Parameters

p: parameter for norm

Overrides: `object.__init__` `extit`(inherited documentation)

```
--call--(self, *args)
```

Calculate result of norm(arg1,arg2,...)

Parameters

args: list of floats as arguments for norm.

Return Value

result of norm calculation

(*type=float*)

Raises

NormException any problem in calculation (wrong number of arguments, numerical problems)

Overrides: *fuzzy.norm.Norm.Norm.__call__* extit(inherited documentation)

Inherited from fuzzy.norm.Norm.Norm(Section 68.4)

getType()

Inherited from object

__delattr__(), *__getattr__()*, *__hash__()*, *__new__()*, *__reduce__()*, *__reduce_ex__()*,
__repr__(), *__setattr__()*, *__str__()*

76.2.2 Properties

Name	Description
<i>Inherited from fuzzy.norm.ParametricNorm.ParametricNorm (Section 69.2)</i>	
<i>p_range</i>	
<i>Inherited from object</i>	
<i>__class__</i>	

76.2.3 Class Variables

Name	Description
<i>Inherited from fuzzy.norm.Norm.Norm (Section 68.4)</i>	
<i>S_NORM</i> , <i>T_NORM</i> , <i>UNKNOWN</i>	

76.2.4 Instance Variables

Name	Description
<i>Inherited from fuzzy.norm.ParametricNorm.ParametricNorm (Section 69.2)</i>	
<i>p</i>	

77 Module *fuzzy.norm.YagerUnion*

77.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: YagerUnion.py,v 1.5 2009/09/24 20:32:20 rliebscher ...

77.2 Class *YagerUnion*

object └

fuzzy.norm.Norm.Norm └

fuzzy.norm.ParametricNorm.ParametricNorm └ **fuzzy.norm.YagerUnion.YagerUnion**

Yager 1980

77.2.1 Methods

__init__(*self*, *p*=1.0)

Initialize type and parameter

Parameters

p: parameter for norm

Overrides: object.__init__ extit(inherited documentation)

```
--call--(self, *args)
```

Calculate result of norm(arg1,arg2,...)

Parameters

args: list of floats as arguments for norm.

Return Value

result of norm calculation

(*type=float*)

Raises

NormException any problem in calculation (wrong number of arguments, numerical problems)

Overrides: *fuzzy.norm.Norm.Norm.__call__* extit(inherited documentation)

Inherited from fuzzy.norm.Norm.Norm(Section 68.4)

getType()

Inherited from object

__delattr__(), *__getattr__()*, *__hash__()*, *__new__()*, *__reduce__()*, *__reduce_ex__()*,
__repr__(), *__setattr__()*, *__str__()*

77.2.2 Properties

Name	Description
<i>Inherited from fuzzy.norm.ParametricNorm.ParametricNorm (Section 69.2)</i>	
<i>p_range</i>	
<i>Inherited from object</i>	
<i>__class__</i>	

77.2.3 Class Variables

Name	Description
<i>Inherited from fuzzy.norm.Norm.Norm (Section 68.4)</i>	
<i>S_NORM</i> , <i>T_NORM</i> , <i>UNKNOWN</i>	

77.2.4 Instance Variables

Name	Description
<i>Inherited from fuzzy.norm.ParametricNorm.ParametricNorm (Section 69.2)</i>	
<i>p</i>	

78 Package fuzzy.operator

These operators are used to build fuzzy rules.

For example:

$c\{(A \text{ and } B) \text{ or not } C\}$

where

- A,B,C is an adjective of a fuzzy variable and
- 'and'/'or' are fuzzy norms

can be modelled as:

```
Compound(FuzzyOr(),
    Compound(FuzzyAnd(),
        Input(A),
        Input(B)
    ),
    Not(
        Input(C)
    )
)
```

78.1 Modules

- **Compound:** The Compound class takes values of several input operators and processes them through a given norm.
(Section 79, p. 177)
- **Const:** Special operator class which returns a constant value.
(Section 80, p. 179)
- **Input:** Special operator class which gets its value from a fuzzy adjective.
(Section 81, p. 181)
- **Not:** Operator class which takes value of input operator and calculates complement of it.
(Section 82, p. 183)
- **Operator:** Calculate value for fuzzy rule.
(Section 83, p. 185)

78.2 Variables

Name	Description
__revision__	Value: '\$Id: __init__.py,v 1.4 2009/08/07 07:19:19 rliebscher Ex...

continued on next page

Name	Description
------	-------------

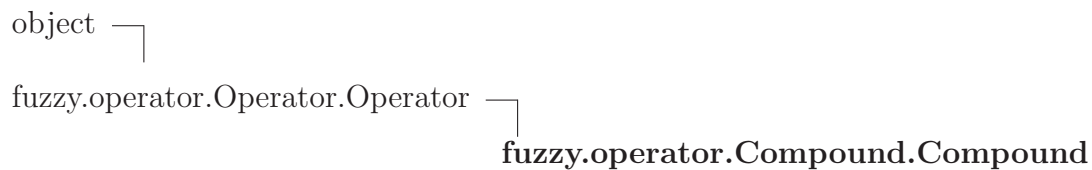
79 Module fuzzy.operator.Compound

The Compound class takes values of several input operators and processes them through a given norm.

79.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: Compound.py,v 1.12 2009/10/07 21:08:14 rliebscher E...

79.2 Class Compound



Take values of input operators and process them through the given norm.

79.2.1 Methods

<code>__init__(self, norm, *inputs)</code>
Constructor.
Parameters
norm: how to combine inputs. (eg. Min,Max,...) (<i>type=fuzzy.norm.Norm.Norm</i>)
inputs: list of inputs (subclassed from fuzzy.operator.Operator.Operator).
Overrides: object.__init__

<code>--call--(self)</code>
Get current value of input and combine them with help of norm.
Return Value result of operator calculation (<i>type=float</i>)
Raises fuzzy.Exception.Exception any problem in calculation
Overrides: fuzzy.operator.Operator.Operator. <code>--call--</code>

Inherited from object

`--delattr--()`, `--getattr--()`, `--hash--()`, `--new--()`, `--reduce--()`, `--reduce_ex--()`,
`--repr--()`, `--setattr--()`, `--str--()`

79.2.2 Properties

Name	Description
<i>Inherited from object</i>	
<code>--class--</code>	

79.2.3 Instance Variables

Name	Description
inputs	list of inputs (subclassed from <code>fuzzy.operator.Operator.Operator</code>).
norm	how to combine inputs. (eg. Min,Max,...) (<i>type=fuzzy.norm.Norm.Norm</i>)

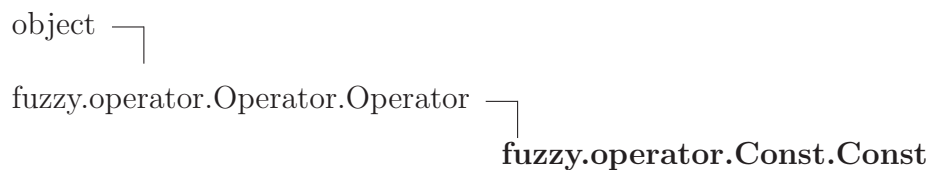
80 Module fuzzy.operator.Const

Special operator class which returns a constant value.

80.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: Const.py,v 1.11 2009/10/07 21:08:14 rliebscher Exp \$'

80.2 Class Const



Special operator which returns a constant value.

80.2.1 Methods

<code>__init__(self, value)</code> Constructor. Parameters value: value returned at call of <code>__call__()</code> . (<i>type=float</i>) Overrides: <code>object.__init__</code>
<code>__call__(self)</code> Return stored constant value. Return Value result of operator calculation (<i>type=float</i>) Raises <code>fuzzy.Exception.Exception</code> any problem in calculation Overrides: <code>fuzzy.operator.Operator.Operator.__call__</code>

Inherited from object

`__delattr__()`, `__getattr__()`, `__hash__()`, `__new__()`, `__reduce__()`, `__reduce_ex__()`,
`__repr__()`, `__setattr__()`, `__str__()`

80.2.2 Properties

Name	Description
<i>Inherited from object</i> <code>__class__</code>	

80.2.3 Instance Variables

Name	Description
value	value returned at call of <code>__call__()</code> . (<i>type=float</i>)

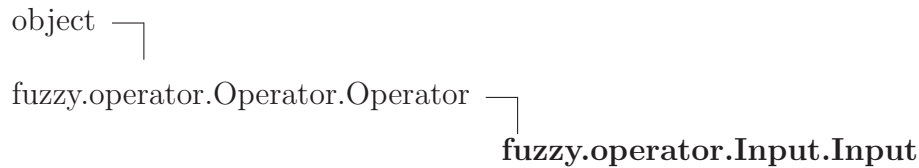
81 Module fuzzy.operator.Input

Special operator class which gets it value from a fuzzy adjective.

81.1 Variables

Name	Description
<code>--revision--</code>	Value: '\$Id: Input.py,v 1.12 2009/10/07 21:08:14 rliebscher Exp \$'

81.2 Class Input



Special operator which gets it value from a fuzzy adjective.

81.2.1 Methods

<code>--init--(self, adjective)</code>
Constructor.
Parameters
adjective: from which adjective get the membership value. (<i>type=fuzzy.Adjective.Adjective</i>)
Overrides: <code>object.__init__</code>

<code>--call--(self)</code>
return membership of given adjective.
Return Value
result of operator calculation (<i>type=float</i>)
Raises
fuzzy.Exception.Exception any problem in calculation
Overrides: <code>fuzzy.operator.Operator.Operator.__call__</code>

Inherited from object

`__delattr__()`, `__getattr__()`, `__hash__()`, `__new__()`, `__reduce__()`, `__reduce_ex__()`,
`__repr__()`, `__setattr__()`, `__str__()`

81.2.2 Properties

Name	Description
<i>Inherited from object</i>	
<code>__class__</code>	

81.2.3 Instance Variables

Name	Description
<code>adjective</code>	from which adjective get the membership value. <i>(type=fuzzy.Adjective.Adjective)</i>

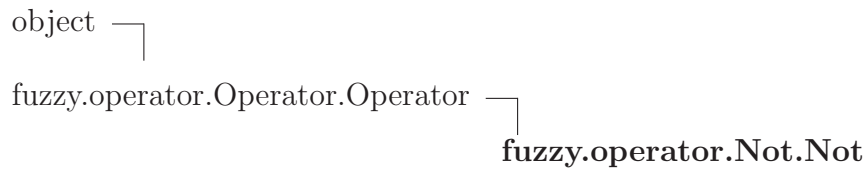
82 Module fuzzy.operator.Not

Operator class which takes value of input operator and calculates complement of it.

82.1 Variables

Name	Description
<code>--revision--</code>	Value: '\$Id: Not.py,v 1.13 2009/10/07 21:08:14 rliebscher Exp \$'

82.2 Class Not



Take value of input operator and calculate complement of it.

82.2.1 Methods

<code>--init--(self, input)</code> Constructor. Parameters <input/> : input which result is to complement. (<i>type=fuzzy.operator.Operator.Operator</i>) Overrides: object.__init__
<code>--call--(self)</code> Get input value and return 1.0-value. Return Value result of operator calculation (<i>type=float</i>) Raises fuzzy.Exception.Exception any problem in calculation Overrides: fuzzy.operator.Operator.Operator.__call__

Inherited from object

`__delattr__()`, `__getattr__()`, `__hash__()`, `__new__()`, `__reduce__()`, `__reduce_ex__()`,
`__repr__()`, `__setattr__()`, `__str__()`

82.2.2 Properties

Name	Description
<i>Inherited from object</i>	
<code>__class__</code>	

82.2.3 Instance Variables

Name	Description
input	input which result is to complement. <i>(type=fuzzy.operator.Operator.Operator)</i>

83 Module fuzzy.operator.Operator

Calculate value for fuzzy rule.

Used to build fuzzy rules.

83.1 Variables

Name	Description
<code>--revision--</code>	Value: '\$Id: Operator.py,v 1.9 2009/08/07 07:19:19 rliebscher Ex...

83.2 Class Operator

object └─ **fuzzy.operator.Operator.Operator**

Known Subclasses: fuzzy.operator.Not.Not, fuzzy.operator.Const.Const, fuzzy.operator.Input.Input, fuzzy.operator.Compound.Compound

Abstract base class for any kind of operator.

83.2.1 Methods

<code>--init--(self)</code>
Dummy initialization, so it is safe to call it from any sub class. Overrides: object.__init__
<code>--call--(self)</code>
Return current value.
Return Value result of operator calculation (<i>type=float</i>)
Raises fuzzy.Exception.Exception any problem in calculation

Inherited from object

`__delattr__()`, `__getattr__()`, `__hash__()`, `__new__()`, `__reduce__()`, `__reduce_ex__()`,
`__repr__()`, `__setattr__()`, `__str__()`

83.2.2 Properties

Name	Description
<i>Inherited from object</i>	
<code>__class__</code>	

84 Package fuzzy.set

Different kind of fuzzy sets. For any of these you can call `set(x)` to get the membership value of x.

See `Set` for more.

Examples can be found here <http://pyfuzzy.sourceforge.net/demo/set/>

84.1 Modules

- **Function** (*Section 85, p. 188*)
- **PiFunction** (*Section 86, p. 189*)
- **Polygon** (*Section 87, p. 192*)
- **SFunction** (*Section 88, p. 195*)
- **Set**: Base class for all fuzzy sets.
(*Section 89, p. 198*)
- **Singleton** (*Section 90, p. 200*)
- **Trapez** (*Section 91, p. 203*)
- **Triangle** (*Section 92, p. 206*)
- **ZFunction** (*Section 93, p. 209*)
- **operations**: Helper functions for calculation with fuzzy sets.
(*Section 94, p. 212*)

84.2 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: __init__.py,v 1.8 2009/08/07 07:19:19 rliebscher Ex...

85 Module fuzzy.set.Function

85.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: Function.py,v 1.9 2009/08/07 07:19:19 rliebscher Ex...

85.2 Class Function



Known Subclasses: fuzzy.set.SFunction.SFunction, fuzzy.set.PiFunction.PiFunction

Base class for any fuzzy set defined by a function (not a polygon).

85.2.1 Methods

Inherited from fuzzy.set.Set.Set(Section 89.2)

`__call__()`, `getCOG()`, `getIntervalGenerator()`

Inherited from object

`__delattr__()`, `__getattr__()`, `__hash__()`, `__init__()`, `__new__()`, `__reduce__()`, `__reduce_ex__()`, `__repr__()`, `__setattr__()`, `__str__()`

85.2.2 Properties

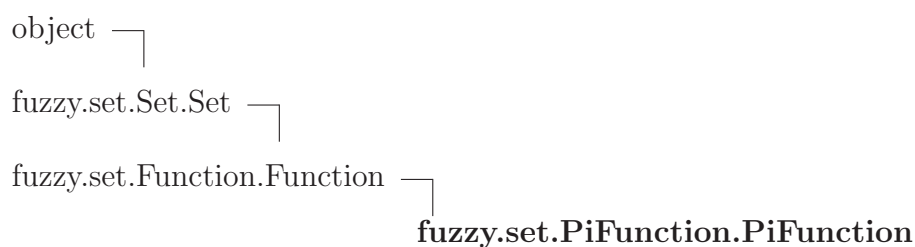
Name	Description
<i>Inherited from object</i>	
<code>__class__</code>	

86 Module fuzzy.set.PiFunction

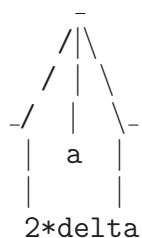
86.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: PiFunction.py,v 1.13 2009/08/07 07:19:19 rliebscher...

86.2 Class PiFunction



Realize a Pi-shaped fuzzy set:



See also <http://pyfuzzy.sourceforge.net/demo/set/PiFunction.png>

86.2.1 Methods

__init__(*self*, *a*=0.0, *delta*=1.0)

Initialize a Pi-shaped fuzzy set.

Parameters

a: center of set

(*type*=float)

delta: absolute distance between x-values for minimum and maximum

(*type*=float)

Overrides: object.__init__

__call__(*self*, *x*)

Return membership of x in this fuzzy set. This method makes the set work like a function.

Parameters

x: value for which the membership is to calculate

(*type*=float)

Return Value

membership

(*type*=float)

Overrides: fuzzy.set.Set.Set.__call__

getCOG(*self*)

Return center of gravity.

Return Value

x-value of center of gravity

(*type*=float)

Overrides: fuzzy.set.Set.Set.getCOG

getIntervalGenerator(*self*)

Internal helper function to help convert arbitrary fuzzy sets in fuzzy sets represented by a polygon.

Overrides: fuzzy.set.Set.Set.getIntervalGenerator extit(inherited documentation)

Inherited from object

`__delattr__()`, `__getattr__()`, `__hash__()`, `__new__()`, `__reduce__()`, `__reduce_ex__()`,
`__repr__()`, `__setattr__()`, `__str__()`

86.2.2 Properties

Name	Description
<i>Inherited from object</i>	
<code>__class__</code>	

86.2.3 Instance Variables

Name	Description
<code>a</code>	center of set. (<i>type=float</i>)
<code>delta</code>	absolute distance between x-values for minimum and maximum. (<i>type=float</i>)

__call__(self, x)

Get membership of value x.

Parameters

x: value x

Return Value

membership for value x

(*type=float*)

Overrides: fuzzy.set.Set.Set.__call__

add(self, x, y, where=1)

Add a new point to the polygon. The parameter where controls at which end it is inserted. (The points are always sorted, but if two have the same x value their order is important. For example: adding a second point(y=0) in the middle:

now	where=END	where=BEGIN
--	*--*	* *
\		\ \
\		\ \
*	*--*	* *

remove(self, x, where=1)

Remove a point from the polygon. The parameter where controls at which end it is removed. (The points are always sorted, but if two have the same x value their order is important. For example: removing the second point in the middle:

now	where=END	where=BEGIN
--	*--*	*
	\	\
	\	\
--	*	*--*

clear(self)

Reset polygon to zero.

getIntervalGenerator(*self*)

Internal helper function to help convert arbitrary fuzzy sets in fuzzy sets represented by a polygon.

Overrides: fuzzy.set.Set.Set.getIntervalGenerator extit(inherited documentation)

getCOG(*self*)

Return center of gravity.

Return Value

x-value of center of gravity

(*type=float*)

Overrides: fuzzy.set.Set.Set.getCOG

Inherited from object

`--delattr--()`, `--getattr--()`, `--hash--()`, `--new--()`, `--reduce--()`, `--reduce.ex--()`, `--repr--()`, `--setattr--()`, `--str--()`

87.2.2 Properties

Name	Description
points	points of the polygon. (<i>type=list of 2-tuple (x,y)</i>)
<i>Inherited from object</i>	
<code>--class--</code>	

87.2.3 Class Variables

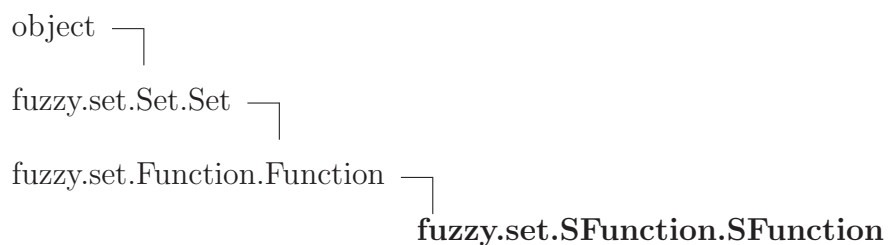
Name	Description
X	index of x value in tuple Value: 0
Y	index of y value in tuple Value: 1
BEGIN	Value: 0
END	Value: 1

88 Module fuzzy.set.SFunction

88.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: SFunction.py,v 1.14 2009/08/31 21:02:06 rliebscher ...

88.2 Class SFunction



Known Subclasses: fuzzy.set.ZFunction.ZFunction

Realize a S-shaped fuzzy set:



See also <http://pyfuzzy.sourceforge.net/demo/set/SFunction.png>

88.2.1 Methods

__init__(*self*, *a*=0.0, *delta*=1.0)

Initialize a S-shaped fuzzy set.

Parameters

a: center of set

(*type*=float)

delta: absolute distance between x-values for minimum and maximum

(*type*=float)

Overrides: object.__init__

__call__(*self*, *x*)

Return membership of x in this fuzzy set. This method makes the set work like a function.

Parameters

x: value for which the membership is to calculate

(*type*=float)

Return Value

membership

(*type*=float)

Overrides: fuzzy.set.Set.Set.__call__

getCOG(*self*)

Return center of gravity.

Return Value

x-value of center of gravity

(*type*=float)

Overrides: fuzzy.set.Set.Set.getCOG

getIntervalGenerator(*self*)

Internal helper function to help convert arbitrary fuzzy sets in fuzzy sets represented by a polygon.

Overrides: fuzzy.set.Set.Set.getIntervalGenerator extit(inherited documentation)

Inherited from object

`__delattr__()`, `__getattr__()`, `__hash__()`, `__new__()`, `__reduce__()`, `__reduce_ex__()`,
`__repr__()`, `__setattr__()`, `__str__()`

88.2.2 Properties

Name	Description
<i>Inherited from object</i>	
<code>__class__</code>	

88.2.3 Instance Variables

Name	Description
<code>a</code>	center of set. (<i>type=float</i>)
<code>delta</code>	absolute distance between x-values for minimum and maximum. (<i>type=float</i>)

89 Module fuzzy.set.Set

Base class for all fuzzy sets.

89.1 Variables

Name	Description
<code>--revision--</code>	Value: '\$Id: Set.py,v 1.17 2009/08/07 07:19:19 rliebscher Exp \$'

89.2 Class Set

object —
fuzzy.set.Set.Set

Known Subclasses: fuzzy.set.Function.Function, fuzzy.set.Polygon.Polygon

Base class for all types of fuzzy sets.

89.2.1 Methods

<code>--call--(self, x)</code>
Return membership of x in this fuzzy set. This method makes the set work like a function.
Parameters
x: value x (<i>type=float</i>)
Return Value
membership for value x (<i>type=float</i>)

<code>getIntervalGenerator(self)</code>
Internal helper function to help convert arbitrary fuzzy sets in fuzzy sets represented by a polygon.

getCOG(*self*)

Returns center of gravity.

Return Value

x-value of center of gravity

*(type=float)****Inherited from object***`__delattr__()`, `__getattr__()`, `__hash__()`, `__init__()`, `__new__()`, `__reduce__()`, `__reduce_ex__()`,
`__repr__()`, `__setattr__()`, `__str__()`**89.2.2 Properties**

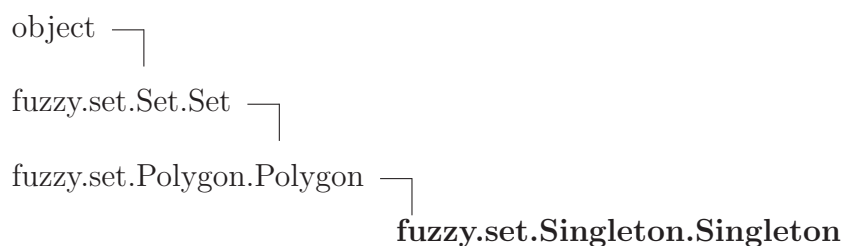
Name	Description
<i>Inherited from object</i>	
<code>__class__</code>	

90 Module fuzzy.set.Singleton

90.1 Variables

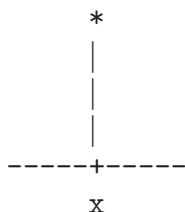
Name	Description
<code>__revision__</code>	Value: '\$Id: Singleton.py,v 1.11 2009/08/31 21:02:06 rliebscher ...

90.2 Class Singleton



This set represents a non-fuzzy number.

Its membership is only for x equal 1.:



See also <http://pyfuzzy.sourceforge.net/demo/set/Singleton.png>

90.2.1 Methods

```
__init__(self, x=0.0)
```

Initialize with given sorted list of (x,y) values

Parameters

points: sorted list of 2-tuples of (x,y) values

Overrides: object.__init__ extit(inherited documentation)

<code>--call--(self, x)</code>
Get membership of value x.
Parameters
x : value x
Return Value
membership for value x
(<i>type=float</i>)
Overrides: fuzzy.set.Set.Set.--call--

<code>getCOG(self)</code>
Return center of gravity.
Return Value
x-value of center of gravity
(<i>type=float</i>)
Overrides: fuzzy.set.Set.Set.getCOG

<code>add(self, x, y, where=1)</code>
Don't let anyone destroy our singleton.
Overrides: fuzzy.set.Polygon.Polygon.add

<code>remove(self, x, where=1)</code>
Don't let anyone destroy our singleton.
Overrides: fuzzy.set.Polygon.Polygon.remove

<code>clear(self)</code>
Don't let anyone destroy our singleton.
Overrides: fuzzy.set.Polygon.Polygon.clear

Inherited from fuzzy.set.Polygon.Polygon(Section 87.2)

getIntervalGenerator()

Inherited from object

`--delattr--()`, `--getattribute--()`, `--hash--()`, `--new--()`, `--reduce--()`, `--reduce_ex--()`,
`--repr--()`, `--setattr--()`, `--str--()`

90.2.2 Properties

Name	Description
x	x (<i>type=float</i>)
<i>Inherited from fuzzy.set.Polygon.Polygon (Section 87.2)</i>	
points	
<i>Inherited from object</i>	
__class__	

90.2.3 Class Variables

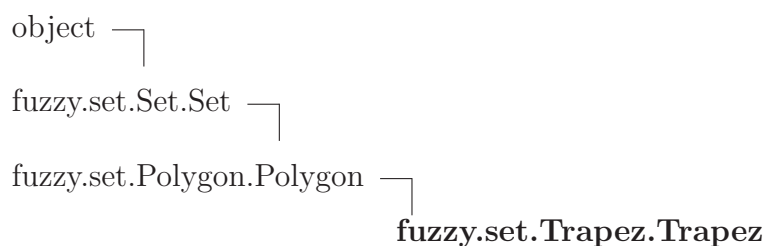
Name	Description
<i>Inherited from fuzzy.set.Polygon.Polygon (Section 87.2)</i>	
BEGIN, END, X, Y	

91 Module fuzzy.set.Trapez

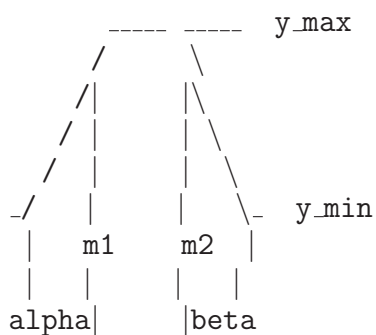
91.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: Trapez.py,v 1.12 2009/08/07 07:19:19 rliebscher Exp \$'

91.2 Class Trapez



Realize a trapez-shaped fuzzy set:



See also <http://pyfuzzy.sourceforge.net/demo/set/Trapez.png>

91.2.1 Methods

```
__init__(self, m1=-0.5, m2=0.5, alpha=0.5, beta=0.5, y_max=1.0,
y_min=0.0)
```

Initialize a trapez-shaped fuzzy set.

Parameters

y_max: y-value at top of the trapez (1.0)
y_min: y-value outside the trapez (0.0)
m1: x-value of left top of trapez (-0.5)
m2: x-value of right top of trapez (0.5)
alpha: distance of left corner to m1 (0.5)
beta: distance of right corner to m2 (0.5)

Overrides: object.__init__

```
add(self, x, y, where=1)
```

Don't let anyone destroy our trapez.

Overrides: fuzzy.set.Polygon.Polygon.add

```
remove(self, x, where=1)
```

Don't let anyone destroy our trapez.

Overrides: fuzzy.set.Polygon.Polygon.remove

```
clear(self)
```

Don't let anyone destroy our trapez.

Overrides: fuzzy.set.Polygon.Polygon.clear

Inherited from fuzzy.set.Polygon.Polygon(Section 87.2)

__call__(), getCOG(), getIntervalGenerator()

Inherited from object

__delattr__(), __getattr__(), __hash__(), __new__(), __reduce__(), __reduce_ex__(),
__repr__(), __setattr__(), __str__()

91.2.2 Properties

Name	Description
y_max	y-value at top of the trapez (<i>type=float</i>)
y_min	y-value outside the trapez (<i>type=float</i>)
m1	x-value of left top of trapez (<i>type=float</i>)
m2	x-value of right top of trapez (<i>type=float</i>)
alpha	distance of left corner to m1 (<i>type=float</i>)
beta	distance of right corner to m2 (<i>type=float</i>)
<i>Inherited from fuzzy.set.Polygon.Polygon (Section 87.2)</i>	
points	
<i>Inherited from object</i>	
__class__	

91.2.3 Class Variables

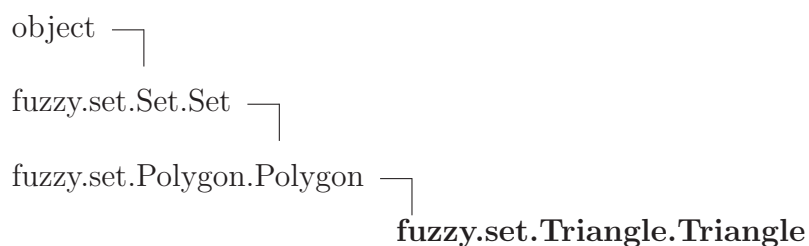
Name	Description
<i>Inherited from fuzzy.set.Polygon.Polygon (Section 87.2)</i>	
BEGIN, END, X, Y	

92 Module `fuzzy.set.Triangle`

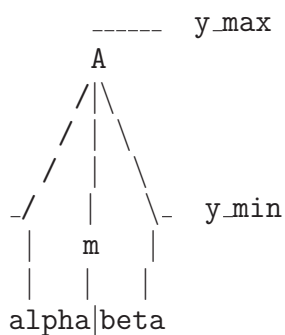
92.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: Triangle.py,v 1.13 2009/08/07 07:19:19 rliebscher E...

92.2 Class `Triangle`



Realize a triangle-shaped fuzzy set:



See also <http://pyfuzzy.sourceforge.net/demo/set/Triangle.png>

92.2.1 Methods

`__init__(self, m=0.0, alpha=1.0, beta=1.0, y_max=1.0, y_min=0.0)`

Initialize a triangle-shaped fuzzy set.

Parameters

y_max: y-value at top of the triangle (1.0)

y_min: y-value outside the triangle (0.0)

m: x-value of top of triangle (0.0)

alpha: distance of left corner to m (1.0)

beta: distance of right corner to m (1.0)

Overrides: `object.__init__`

`add(self, x, y, where=1)`

Don't let anyone destroy our triangle.

Overrides: `fuzzy.set.Polygon.Polygon.add`

`remove(self, x, where=1)`

Don't let anyone destroy our triangle.

Overrides: `fuzzy.set.Polygon.Polygon.remove`

`clear(self)`

Don't let anyone destroy our triangle.

Overrides: `fuzzy.set.Polygon.Polygon.clear`

Inherited from `fuzzy.set.Polygon.Polygon` (Section 87.2)

`__call__()`, `getCOG()`, `getIntervalGenerator()`

Inherited from `object`

`__delattr__()`, `__getattr__()`, `__hash__()`, `__new__()`, `__reduce__()`, `__reduce_ex__()`,
`__repr__()`, `__setattr__()`, `__str__()`

92.2.2 Properties

Name	Description
<code>y_max</code>	y-value at top of the triangle (<i>type=float</i>)

continued on next page

Name	Description
y_min	y-value outside the triangle (<i>type=float</i>)
m	x-value of top of triangle (<i>type=float</i>)
alpha	distance of left corner to m (<i>type=float</i>)
beta	distance of right corner to m (<i>type=float</i>)
<i>Inherited from fuzzy.set.Polygon.Polygon (Section 87.2)</i>	
points	
<i>Inherited from object</i>	
__class__	

92.2.3 Class Variables

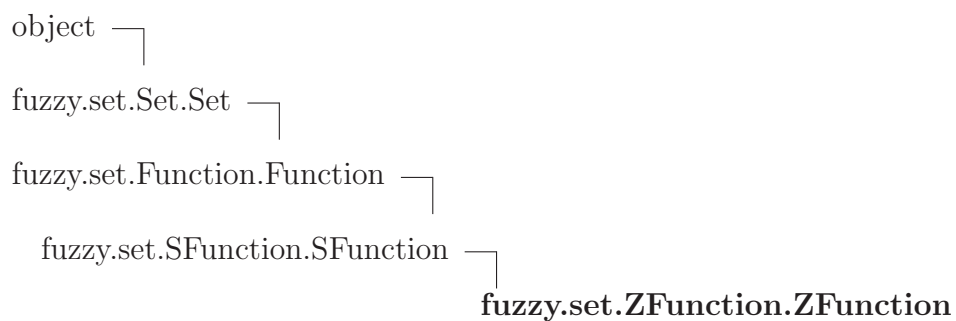
Name	Description
<i>Inherited from fuzzy.set.Polygon.Polygon (Section 87.2)</i>	
BEGIN, END, X, Y	

93 Module fuzzy.set.ZFunction

93.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: ZFunction.py,v 1.13 2009/08/07 07:19:19 rliebscher ...

93.2 Class ZFunction



Realize a Z-shaped fuzzy set:



see also <http://pyfuzzy.sourceforge.net/demo/set/ZFunction.png>

93.2.1 Methods

__init__(*self*, *a*=0.0, *delta*=1.0)

Initialize a Z-shaped fuzzy set.

Parameters

a: center of set

(*type*=float)

delta: absolute distance between x-values for minimum and maximum

(*type*=float)

Overrides: object.__init__

__call__(*self*, *x*)

Return membership of x in this fuzzy set. This method makes the set work like a function.

Parameters

x: value for which the membership is to calculate

(*type*=float)

Return Value

membership

(*type*=float)

Overrides: fuzzy.set.Set.Set.__call__

Inherited from fuzzy.set.SFunction.SFunction(Section 88.2)

getCOG(), getIntervalGenerator()

Inherited from object

__delattr__(), __getattr__(), __hash__(), __new__(), __reduce__(), __reduce_ex__(),
__repr__(), __setattr__(), __str__()

93.2.2 Properties

Name	Description
<i>Inherited from object</i>	
__class__	

93.2.3 Instance Variables

Name	Description
a	center of set. (<i>type=float</i>)
delta	absolute distance between x-values for minimum and maximum. (<i>type=float</i>)

94 Module *fuzzy.set.operations*

Helper functions for calculation with fuzzy sets.

Examples can be found here [U{http://pyfuzzy.sourceforge.net/demo/merge/}](http://pyfuzzy.sourceforge.net/demo/merge/)

* Intersection of *set1* and *set2* can be done by

```
C{set = merge(T_NORM,set1,set2)}
```

where *T_NORM* is a t-norm eg. *Min*.

(or a function which accepts two parameters as *min()*.)

* Union of *set1* and *set2* can be done by

```
C{set = merge(S_NORM,set1,set2)}
```

where *S_NORM* is a s-norm eg. *Max*.

(or a function which accepts two parameters as *max()*.)

* Complement of *set1* can be done by

```
C{set = norm(lambda a,b:1.0-a ,set1,0.0)}
```

using a user defined function for it.

(The second parameter is ignored or better said it doesn't influence the value, it only influences maybe where the points of the resulting polygon are set.)

* Activation function can be done by

```
C{set = norm(act_norm,set,act_value)}
```

where *act_norm* is any *L{fuzzy.norm}* or two params function (eg. *min*) and *act_value* is the result of a rule calculation.

94.1 Functions

merge(*NORM*, *set1*, *set2*, *segment_size*=None)

Returns a new fuzzy set which is the merger of *set1* and *set2*, where the membership of the result set is equal to $\text{NORM}(\text{set1}(x), \text{set2}(x))$.

For nonlinear operations you might want to set the segment size to a value which controls how large a linear segment of the result can be. See also the following examples:

- http://pyfuzzy.sourceforge.net/demo/merge/AlgebraicProduct_d_d.png - The algebraic product is $x*y$, so using it on the same set, it calculates the square of it.
- http://pyfuzzy.sourceforge.net/demo/merge/AlgebraicSum_d_d.png - The algebraic sum is $x+y-x*y$.

Parameters

NORM: fuzzy norm to calculate both sets values. For example `Min()`, `Max()`, ... Also possible as two params function, eg. `lambda a,b: (a+b)/2..`
(*type=fuzzy.norm.Norm.Norm*)

set1: fuzzy set
(*type=fuzzy.set.Set*)

set2: fuzzy set
(*type=fuzzy.set.Set*)

segment_size: maximum size of a segment
(*type=float/None*)

Return Value

resulting fuzzy set
(*type=fuzzy.set.Polygon.Polygon*)

norm(*NORM*, *set*, *value*, *segment_size*=None)

Returns a new fuzzy set which is this set normed with value. where the membership of the result set is equal to `NORM(set(x),value)`.

For meaning of `segment_size` see also `fuzzy.set.operations.merge`.

Parameters

NORM: fuzzy norm to calculate set's values with value. For example `Min()`, `Max()`, ... Also possible as two params function, eg. `lambda a,b: (a+b)/2..`
(type=fuzzy.norm.Norm.Norm)

set: fuzzy set
(type=fuzzy.set.Set)

value: value
(type=float)

segment_size: maximum size of a segment
(type=float/None)

Return Value

resulting fuzzy set
(type=fuzzy.set.Polygon.Polygon)

complement(*COMPLEMENT*, *set*, *segment_size*=None)

Returns a new fuzzy set which is the complement of the given set. (Where the membership of the result set is equal to `COMPLEMENT(set(x))`).

For meaning of `segment_size` see also `fuzzy.set.operations.merge`.

Parameters

COMPLEMENT: fuzzy complement to use. For example `Zadeh()`, ...
Also possible as one param function, eg. `lambda x: 1.-x`.

(*type*=`fuzzy.complement.Base.Base`)

set: fuzzy set

(*type*=`fuzzy.set.Set`)

segment_size: maximum size of a segment

(*type*=`float/None`)

Return Value

resulting fuzzy set

(*type*=`fuzzy.set.Polygon.Polygon`)

94.2 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: operations.py,v 1.5 2009/09/24 20:32:20 rliebscher ...

95 Package *fuzzy.storage*

Storage functions.

95.1 Modules

- **fcl**: Reading and writing FCL files.
(Section 96, p. 217)
 - **FCLLexer**: Lexer for reading FCL by the *pyfuzzy* package.
(Section 97, p. 218)
 - **FCLParser**: Parser for reading FCL by the *pyfuzzy* package.
(Section 98, p. 225)
 - **Reader** (Section 99, p. 239)

95.2 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: __init__.py,v 1.2 2009/08/07 07:19:19 rliebscher Ex...

96 Package `fuzzy.storage.fcl`

Reading and writing FCL files.

96.1 Modules

- **FCLLexer**: Lexer for reading FCL by the `pyfuzzy` package.
(Section 97, p. 218)
- **FCLParser**: Parser for reading FCL by the `pyfuzzy` package.
(Section 98, p. 225)
- **Reader** (Section 99, p. 239)

96.2 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: __init__.py,v 1.2 2009/08/07 07:19:19 rliebscher Ex...

97 Module `fuzzy.storage.fcl.FCLLexer`

Lexer for reading FCL by the `pyfuzzy` package.

97.1 Functions

<code>main(argv, stdin=sys.stderr, stdout=sys.stderr, stderr=sys.stderr)</code>

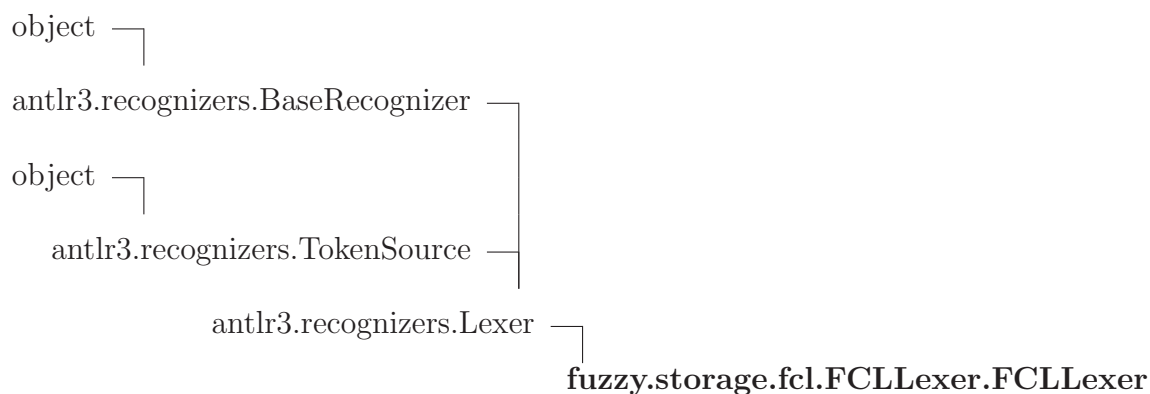
97.2 Variables

Name	Description
<code>__doc__</code>	Value: <code>"""Lexer for reading FCL by the pyfuzzy package."""</code>
<code>__revision__</code>	Value: <code>'\$Id: FCL.g,v 1.6 2009/09/27 18:20:00 rliebscher Exp \$'</code>
<code>HIDDEN</code>	Value: 99
<code>T__29</code>	Value: 29
<code>T__28</code>	Value: 28
<code>T__27</code>	Value: 27
<code>Real.literal</code>	Value: 9
<code>OR_</code>	Value: 6
<code>T__26</code>	Value: 26
<code>T__25</code>	Value: 25
<code>T__24</code>	Value: 24
<code>T__23</code>	Value: 23
<code>LETTER</code>	Value: 10
<code>T__22</code>	Value: 22
<code>T__21</code>	Value: 21
<code>T__20</code>	Value: 20
<code>AND_</code>	Value: 7
<code>EOF</code>	Value: -1
<code>Identifier</code>	Value: 4
<code>T__55</code>	Value: 55
<code>T__56</code>	Value: 56
<code>T__19</code>	Value: 19
<code>T__57</code>	Value: 57
<code>T__58</code>	Value: 58
<code>T__16</code>	Value: 16
<code>T__51</code>	Value: 51
<code>T__15</code>	Value: 15
<code>T__52</code>	Value: 52

continued on next page

Name	Description
T__18	Value: 18
T__53	Value: 53
T__54	Value: 54
T__17	Value: 17
Integer_literal_wo_sign	Value: 11
T__14	Value: 14
T__59	Value: 59
DIGIT	Value: 5
COMMENT	Value: 13
T__50	Value: 50
T__42	Value: 42
T__43	Value: 43
T__40	Value: 40
T__41	Value: 41
T__46	Value: 46
T__47	Value: 47
T__44	Value: 44
T__45	Value: 45
T__48	Value: 48
T__49	Value: 49
T__30	Value: 30
T__31	Value: 31
T__32	Value: 32
T__33	Value: 33
WS	Value: 12
T__34	Value: 34
T__35	Value: 35
Integer_literal	Value: 8
T__36	Value: 36
T__37	Value: 37
T__38	Value: 38
T__39	Value: 39

97.3 Class *FCLLexer*



97.3.1 Methods

`__init__(self, input=None, state=None)`

`x.__init__(...)` initializes `x`; see `x.__class__.__doc__` for signature

Overrides: `object.__init__` `exitit` (inherited documentation)

`mT__14(self)`

`mT__15(self)`

`mT__16(self)`

`mT__17(self)`

`mT__18(self)`

`mT__19(self)`

`mT__20(self)`

`mT__21(self)`

`mT__22(self)`

`mT__23(self)`

<code>mT__24(<i>self</i>)</code>

<code>mT__25(<i>self</i>)</code>

<code>mT__26(<i>self</i>)</code>

<code>mT__27(<i>self</i>)</code>

<code>mT__28(<i>self</i>)</code>

<code>mT__29(<i>self</i>)</code>

<code>mT__30(<i>self</i>)</code>

<code>mT__31(<i>self</i>)</code>

<code>mT__32(<i>self</i>)</code>

<code>mT__33(<i>self</i>)</code>

<code>mT__34(<i>self</i>)</code>

<code>mT__35(<i>self</i>)</code>

<code>mT__36(<i>self</i>)</code>

<code>mT__37(<i>self</i>)</code>

<code>mT__38(<i>self</i>)</code>

<code>mT__39(<i>self</i>)</code>

<code>mT__40(<i>self</i>)</code>

<code>mT__41(<i>self</i>)</code>

<code>mT__42(<i>self</i>)</code>

<code>mT__43(<i>self</i>)</code>

`mT__44(self)``mT__45(self)``mT__46(self)``mT__47(self)``mT__48(self)``mT__49(self)``mT__50(self)``mT__51(self)``mT__52(self)``mT__53(self)``mT__54(self)``mT__55(self)``mT__56(self)``mT__57(self)``mT__58(self)``mT__59(self)``mOR_(self)``mAND_(self)``mIdentifier(self)``mInteger_literal_wo_sign(self)`

mInteger_literal (<i>self</i>)

mLETTER (<i>self</i>)

mDIGIT (<i>self</i>)

mReal_literal (<i>self</i>)

mWS (<i>self</i>)

mCOMMENT (<i>self</i>)

mTokens (<i>self</i>)

This is the lexer entry point that sets instance var 'token'

Overrides: antlr3.recognizers.Lexer.mTokens exitit(inherited documentation)

Inherited from antlr3.recognizers.Lexer

emit(), getCharErrorDisplay(), getCharIndex(), getCharPositionInLine(), getErrorMessage(), getLine(), getSourceName(), getText(), match(), matchAny(), matchRange(), nextToken(), recover(), reportError(), reset(), setCharStream(), setText(), skip(), traceIn(), traceOut()

Inherited from antlr3.recognizers.BaseRecognizer

alreadyParsedRule(), beginResync(), combineFollows(), computeContextSensitiveRuleFOLLOW(), computeErrorRecoverySet(), consumeUntil(), displayRecognitionError(), emitErrorMessage(), endResync(), failed(), getBacktrackingLevel(), getCurrentInputSymbol(), getErrorHeader(), getGrammarFileName(), getMissingSymbol(), getNumberOfSyntaxErrors(), getRuleInvocationStack(), getRuleMemoization(), getTokenErrorDisplay(), memoize(), mismatchIsMissingToken(), mismatchIsUnwantedToken(), recoverFromMismatchedSet(), recoverFromMismatchedToken(), setBacktrackingLevel(), setInput(), toStrings()

Inherited from antlr3.recognizers.TokenSource

__iter__(), next()

Inherited from object

__delattr__(), __getattr__(), __hash__(), __new__(), __reduce__(), __reduce_ex__(), __repr__(), __setattr__(), __str__()

97.3.2 Properties

Name	Description
<i>Inherited from antlr3.recognizers.Lexer</i>	
text	
<i>Inherited from object</i>	
__class__	

97.3.3 Class Variables

Name	Description
grammarFileName	Value: 'FCL.g'
antlr_version	Value: (3, 1, 2, 2147483647)
antlr_version_str	Value: '3.1.2'
DFA8_eot	Value: [-1, 24, 24, 24, 32, 24, -1, 24, 24, 24, 24, 43, -1, -1, ...]
DFA8_eof	Value: [-1, -1, -1, -1, -1, -1, -1, -1, -1, -1, -1, -1, -1, ...]
DFA8_min	Value: [9, 85, 78, 84, 61, 65, -1, 65, 69, 80, 69, 42, -1, -1, 6...]
DFA8_max	Value: [122, 85, 78, 84, 61, 85, -1, 65, 69, 82, 72, 42, -1, -1, ...]
DFA8_accept	Value: [-1, -1, -1, -1, -1, -1, 7, -1, -1, -1, -1, 22, 23, -...]
DFA8_special	Value: [-1, -1, -1, -1, -1, -1, -1, -1, -1, -1, -1, -1, -1, ...]
DFA8_transition	Value: [[27, 27, -1, 27, 27, -1, -1, -1, -1, -1, -1, -1, -1, ...]
<i>Inherited from antlr3.recognizers.BaseRecognizer</i> DEFAULT_TOKEN_CHANNEL, HIDDEN, MEMO_RULE_FAILED, MEMO_RULE_UNKNOWN, tokenNames	

98 Module `fuzzy.storage.fcl.FCLParser`

Parser for reading FCL by the `pyfuzzy` package.

98.1 Functions

getNorm(*name*, *p=None*)

Get an instance of a fuzzy norm with given name. Normally looks into the `fuzzy.norm` package for a suitable class.

getDefuzzificationMethod(*name*)

Get an instance of a defuzzification method with given name. Normally looks into the `fuzzy.defuzzify` package for a suitable class.

defineOperator(*name*, *norm*)

Defines a operator (AND,OR,...) to use a given norm.

getOperator(*name*)

Get the norm for previous defined operator name.

defineStructType(*name*)

Remember name of a struct definition

defineStructTypeElement(*name*, *elem*)

Add a struct element

getStructType(*name*)

Get list of elements of a struct definition

main(*argv*, *stdin=sys.stderr*, *stdout=sys.stderr*, *stderr=sys.stderr*)

98.2 Variables

Name	Description
<code>__doc__</code>	Value: <code>"""Parser for reading FCL by the pyfuzzy package."""</code>

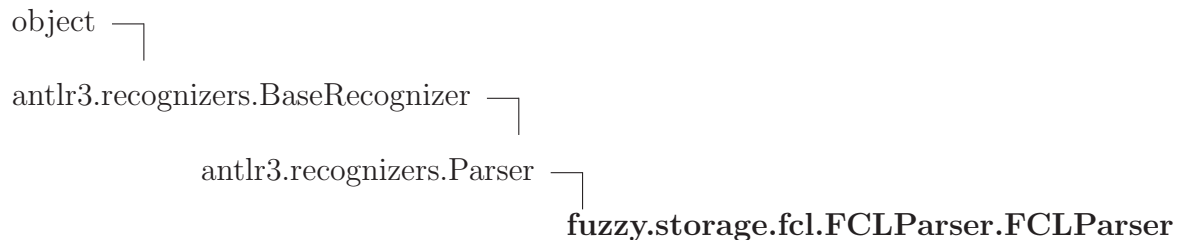
continued on next page

Name	Description
__revision__	Value: '\$Id: FCL.g,v 1.6 2009/09/27 18:20:00 rliebscher Exp \$'
HIDDEN	Value: 99
T__29	Value: 29
T__28	Value: 28
Real_literal	Value: 9
OR_	Value: 6
T__27	Value: 27
T__26	Value: 26
T__25	Value: 25
T__24	Value: 24
LETTER	Value: 10
T__23	Value: 23
T__22	Value: 22
T__21	Value: 21
T__20	Value: 20
AND_	Value: 7
EOF	Value: -1
Identifier	Value: 4
T__55	Value: 55
T__56	Value: 56
T__19	Value: 19
T__57	Value: 57
T__58	Value: 58
T__16	Value: 16
T__51	Value: 51
T__15	Value: 15
T__52	Value: 52
T__18	Value: 18
T__53	Value: 53
T__54	Value: 54
T__17	Value: 17
Integer_literal_wo_sign	Value: 11
T__14	Value: 14
T__59	Value: 59
DIGIT	Value: 5
COMMENT	Value: 13
T__50	Value: 50
T__42	Value: 42
T__43	Value: 43
T__40	Value: 40
T__41	Value: 41

continued on next page

Name	Description
T__46	Value: 46
T__47	Value: 47
T__44	Value: 44
T__45	Value: 45
T__48	Value: 48
T__49	Value: 49
T__30	Value: 30
T__31	Value: 31
T__32	Value: 32
WS	Value: 12
T__33	Value: 33
T__34	Value: 34
Integer_literal	Value: 8
T__35	Value: 35
T__36	Value: 36
T__37	Value: 37
T__38	Value: 38
T__39	Value: 39
tokenNames	Value: ['<invalid>', '<EOR>', '<DOWN>', '<UP>', 'Identifier', 'D...

98.3 Class *FCLParser*



98.3.1 Methods

`__init__(self, input, state=None)`

`x.__init__(...)` initializes `x`; see `x.__class__.__doc__` for signature

Overrides: `object.__init__` extit(inherited documentation)

`main(self)`

```
function_block_declaration(self)
```

```
type_definition(self)
```

```
struct_element(self, struct_name)
```

```
fb_io_var_declarations(self)
```

```
input_declarations(self)
```

```
output_declarations(self)
```

```
var_decl(self, output_var)
```

```
type(self)
```

```
function_block_body(self)
```

```
fuzzify_block(self)
```

```
defuzzify_block(self)
```

```
rule_block(self)
```

```
option_block(self)
```

```
linguistic_term(self, var_name)
```

```
membership_function(self)
```

```
singleton(self)
```

```
points(self)
```

```
defuzzification_method(self, var_name)
```

```
default_value(self, var_name)
```

```
range(self)
```

`operator_name_any(self)``operator_name_AND(self)``operator_name_OR(self)``operator_definition(self)``activation_method(self)``accumulation_method(self)``condition(self)``subcondition(self)``subcondition2(self)``conclusion(self)``conclusion2(self)``conclusion3(self)``rule(self, block_name)``weighting_factor(self)``function_block_name(self)``rule_block_name(self)``term_name(self)``f_variable_name(self)``variable_name(self)``numeric_literal(self)`

Inherited from antlr3.recognizers.Parser

getCurrentInputSymbol(), getMissingSymbol(), getSourceName(), getTokenStream(),
reset(), setTokenStream(), traceIn(), traceOut()

Inherited from antlr3.recognizers.BaseRecognizer

alreadyParsedRule(), beginResync(), combineFollows(), computeContextSensitiveRule-
FOLLOW(), computeErrorRecoverySet(), consumeUntil(), displayRecognitionError(),
emitErrorMessage(), endResync(), failed(), getBacktrackingLevel(), getErrorHandler(),
getErrorMessage(), getGrammarFileName(), getNumberOfSyntaxErrors(), getRuleIn-
vocationStack(), getRuleMemoization(), getTokenErrorDisplay(), match(), matchAny(),
memoize(), mismatchIsMissingToken(), mismatchIsUnwantedToken(), recover(),
recoverFromMismatchedSet(), recoverFromMismatchedToken(), reportError(), set-
BacktrackingLevel(), setInput(), toStrings()

Inherited from object

__delattr__(), __getattr__(), __hash__(), __new__(), __reduce__(), __reduce_ex__(),
__repr__(), __setattr__(), __str__()

98.3.2 Properties

Name	Description
<i>Inherited from object</i>	
__class__	

98.3.3 Class Variables

Name	Description
grammarFileName	Value: 'FCL.g'
antlr_version	Value: (3, 1, 2, 2147483647)
antlr_version_str	Value: '3.1.2'
tokenNames	Value: ['<invalid>', '<EOR>', '<DOWN>', '<UP>', 'Identifier', 'D...']
FOLLOW_function_block_declaration_in_main55	Value: frozenset([1])
FOLLOW_14_in_function_block_declaration71	Value: frozenset([4])
FOLLOW_function_block_name_in_function_block_declaration77	Value: frozenset([15, 16, 21, 23, 24, 26, 28, 30])

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Name	Description
FOLLOW_type_definition_in_function_block_declaration85	Value: frozenset([15, 16, 21, 23, 24, 26, 28, 30])
FOLLOW_fb_io_var_declarations_in_function_block_declaration92	Value: frozenset([15, 21, 23, 24, 26, 28, 30])
FOLLOW_function_block_body_in_function_block_declaration100	Value: frozenset([15])
FOLLOW_15_in_function_block_declaration106	Value: frozenset([])
FOLLOW_EOF_in_function_block_declaration112	Value: frozenset([1])
FOLLOW_16_in_type_definition126	Value: frozenset([4])
FOLLOW_Identifier_in_type_definition128	Value: frozenset([4])
FOLLOW_struct_element_in_type_definition132	Value: frozenset([4, 17])
FOLLOW_17_in_type_definition136	Value: frozenset([1])
FOLLOW_Identifier_in_struct_element151	Value: frozenset([18])
FOLLOW_18_in_struct_element153	Value: frozenset([19])
FOLLOW_19_in_struct_element155	Value: frozenset([20])
FOLLOW_20_in_struct_element157	Value: frozenset([1])
FOLLOW_input_declarations_in_fb_io_var_declarations172	Value: frozenset([1])
FOLLOW_output_declarations_in_fb_io_var_declarations178	Value: frozenset([1])
FOLLOW_21_in_input_declarations189	Value: frozenset([4])
FOLLOW_var_decl_in_input_declarations191	Value: frozenset([4, 22])
FOLLOW_22_in_input_declarations195	Value: frozenset([1])
FOLLOW_23_in_output_declarations203	Value: frozenset([4])

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Name	Description
FOLLOW_var_decl_in_output_declarations205	Value: frozenset([4, 22])
FOLLOW_22_in_output_declarations209	Value: frozenset([1])
FOLLOW_Identifier_in_var_decl223	Value: frozenset([18])
FOLLOW_18_in_var_decl227	Value: frozenset([4, 19])
FOLLOW_type_in_var_decl231	Value: frozenset([20])
FOLLOW_20_in_var_decl235	Value: frozenset([1])
FOLLOW_19_in_type254	Value: frozenset([1])
FOLLOW_Identifier_in_type264	Value: frozenset([1])
FOLLOW_fuzzify_block_in_function_block_body286	Value: frozenset([1, 24, 26, 28, 30])
FOLLOW_defuzzify_block_in_function_block_body293	Value: frozenset([1, 26, 28, 30])
FOLLOW_rule_block_in_function_block_body300	Value: frozenset([1, 28, 30])
FOLLOW_option_block_in_function_block_body307	Value: frozenset([1, 30])
FOLLOW_24_in_fuzzify_block325	Value: frozenset([4])
FOLLOW_variable_name_in_fuzzify_block331	Value: frozenset([25, 32])
FOLLOW_linguistic_term_in_fuzzify_block337	Value: frozenset([25, 32])
FOLLOW_25_in_fuzzify_block345	Value: frozenset([1])
FOLLOW_26_in_defuzzify_block362	Value: frozenset([4])
FOLLOW_f_variable_name_in_defuzzify_block368	Value: frozenset([32, 51])
FOLLOW_linguistic_term_in_defuzzify_block374	Value: frozenset([32, 51])
FOLLOW_accumulation_method_in_defuzzify_block382	Value: frozenset([37])

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Name	Description
FOLLOW_defuzzification_method_in_defuzzify_block388	Value: frozenset([27, 38, 40])
FOLLOW_default_value_in_defuzzify_block395	Value: frozenset([27, 40])
FOLLOW_range_in_defuzzify_block403	Value: frozenset([27])
FOLLOW_27_in_defuzzify_block410	Value: frozenset([1])
FOLLOW_28_in_rule_block427	Value: frozenset([4])
FOLLOW_rule_block_name_in_rule_block435	Value: frozenset([6, 7, 29, 50, 56])
FOLLOW_operator_definition_in_rule_block443	Value: frozenset([6, 7, 29, 50, 56])
FOLLOW_activation_method_in_rule_block452	Value: frozenset([29, 56])
FOLLOW_rule_in_rule_block461	Value: frozenset([29, 56])
FOLLOW_29_in_rule_block469	Value: frozenset([1])
FOLLOW_30_in_option_block477	Value: frozenset([31])
FOLLOW_31_in_option_block481	Value: frozenset([1])
FOLLOW_32_in_linguistic_term496	Value: frozenset([4])
FOLLOW_term_name_in_linguistic_term498	Value: frozenset([33])
FOLLOW_33_in_linguistic_term500	Value: frozenset([4, 8, 9, 34])
FOLLOW_membership_function_in_linguistic_term502	Value: frozenset([20])
FOLLOW_20_in_linguistic_term504	Value: frozenset([1])
FOLLOW_singleton_in_membership_function526	Value: frozenset([1])
FOLLOW_points_in_membership_function538	Value: frozenset([1])
FOLLOW_numeric_literal_in_singleton561	Value: frozenset([1])

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Name	Description
FOLLOW_variable_name_in_singleton573	Value: frozenset([1])
FOLLOW_34_in_points605	Value: frozenset([4, 8, 9])
FOLLOW_numeric_literal_in_points615	Value: frozenset([35])
FOLLOW_variable_name_in_points619	Value: frozenset([35])
FOLLOW_35_in_points627	Value: frozenset([8, 9])
FOLLOW_numeric_literal_in_points636	Value: frozenset([36])
FOLLOW_36_in_points643	Value: frozenset([1, 34])
FOLLOW_37_in_defuzzification_method679	Value: frozenset([18])
FOLLOW_18_in_defuzzification_method681	Value: frozenset([4])
FOLLOW_Identifier_in_defuzzification_method685	Value: frozenset([20])
FOLLOW_20_in_defuzzification_method691	Value: frozenset([1])
FOLLOW_38_in_default_value706	Value: frozenset([33])
FOLLOW_33_in_default_value708	Value: frozenset([8, 9, 39])
FOLLOW_numeric_literal_in_default_value718	Value: frozenset([20])
FOLLOW_39_in_default_value730	Value: frozenset([20])
FOLLOW_20_in_default_value740	Value: frozenset([1])
FOLLOW_40_in_range751	Value: frozenset([33])
FOLLOW_33_in_range753	Value: frozenset([34])
FOLLOW_34_in_range755	Value: frozenset([8, 9])
FOLLOW_numeric_literal_in_range757	Value: frozenset([41])
FOLLOW_41_in_range759	Value: frozenset([8, 9])
FOLLOW_numeric_literal_in_range761	Value: frozenset([36])
FOLLOW_36_in_range763	Value: frozenset([20])
FOLLOW_20_in_range765	Value: frozenset([1])
FOLLOW_Identifier_in_operator_name_any784	Value: frozenset([1, 42])
FOLLOW_42_in_operator_name_any787	Value: frozenset([8, 9])

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Name	Description
FOLLOW_numeric_literal_- in_operator_name_any791	Value: frozenset([43])
FOLLOW_43_in_operator_- name_any793	Value: frozenset([1])
FOLLOW_44_in_operator_- name_AND816	Value: frozenset([1])
FOLLOW_45_in_operator_- name_AND826	Value: frozenset([1])
FOLLOW_46_in_operator_- name_AND836	Value: frozenset([1])
FOLLOW_operator_name_- any_in_operator_name_AN- D849	Value: frozenset([1])
FOLLOW_47_in_operator_- name_OR870	Value: frozenset([1])
FOLLOW_48_in_operator_- name_OR880	Value: frozenset([1])
FOLLOW_49_in_operator_- name_OR890	Value: frozenset([1])
FOLLOW_operator_name_- any_in_operator_name_OR- 903	Value: frozenset([1])
FOLLOW_OR_in_operato- r_definition947	Value: frozenset([18])
FOLLOW_18_in_operator_- definition949	Value: frozenset([4, 47, 48, 49])
FOLLOW_operator_name_- OR_in_operator_definition- 953	Value: frozenset([20])
FOLLOW_AND_in_operato- r_definition964	Value: frozenset([18])
FOLLOW_18_in_operator_- definition966	Value: frozenset([4, 44, 45, 46, 47, 48, 49])
FOLLOW_operator_name_- AND_in_operator_definitio- n970	Value: frozenset([20])
FOLLOW_20_in_operator_- definition979	Value: frozenset([1])
FOLLOW_50_in_activatio- n_method988	Value: frozenset([18])
FOLLOW_18_in_activatio- n_method990	Value: frozenset([44, 45])

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Name	Description
FOLLOW_set_in_activation_method992	Value: frozenset([20])
FOLLOW_20_in_activation_method1000	Value: frozenset([1])
FOLLOW_51_in_accumulation_method1008	Value: frozenset([18])
FOLLOW_18_in_accumulation_method1010	Value: frozenset([47, 49, 52])
FOLLOW_set_in_accumulation_method1012	Value: frozenset([20])
FOLLOW_20_in_accumulation_method1024	Value: frozenset([1])
FOLLOW_subcondition_in_condition1055	Value: frozenset([1, 6, 7])
FOLLOW_set_in_condition1083	Value: frozenset([4, 34, 47, 48, 49, 53])
FOLLOW_subcondition_in_condition1105	Value: frozenset([1, 6, 7])
FOLLOW_53_in_subcondition1145	Value: frozenset([34])
FOLLOW_34_in_subcondition1147	Value: frozenset([4, 34, 47, 48, 49, 53])
FOLLOW_condition_in_subcondition1149	Value: frozenset([36])
FOLLOW_36_in_subcondition1151	Value: frozenset([1])
FOLLOW_subcondition2_in_subcondition1163	Value: frozenset([1])
FOLLOW_34_in_subcondition21190	Value: frozenset([4, 34, 47, 48, 49, 53])
FOLLOW_condition_in_subcondition21194	Value: frozenset([36])
FOLLOW_36_in_subcondition21196	Value: frozenset([1])
FOLLOW_variable_name_in_subcondition21216	Value: frozenset([54, 55])
FOLLOW_54_in_subcondition21219	Value: frozenset([4, 53])
FOLLOW_53_in_subcondition21223	Value: frozenset([4])
FOLLOW_55_in_subcondition21228	Value: frozenset([4])

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Name	Description
FOLLOW_term_name_in_subcondition21232	Value: frozenset([1])
FOLLOW_operator_name_in_subcondition21254	Value: frozenset([34])
FOLLOW_34_in_subcondition21256	Value: frozenset([4, 34, 47, 48, 49, 53])
FOLLOW_condition_in_subcondition21260	Value: frozenset([35])
FOLLOW_35_in_subcondition21262	Value: frozenset([4, 34, 47, 48, 49, 53])
FOLLOW_condition_in_subcondition21266	Value: frozenset([36])
FOLLOW_36_in_subcondition21268	Value: frozenset([1])
FOLLOW_conclusion2_in_conclusion1316	Value: frozenset([1, 35])
FOLLOW_35_in_conclusion1330	Value: frozenset([4, 34])
FOLLOW_conclusion2_in_conclusion1334	Value: frozenset([1, 35])
FOLLOW_34_in_conclusion21368	Value: frozenset([4, 34])
FOLLOW_conclusion3_in_conclusion21372	Value: frozenset([36])
FOLLOW_36_in_conclusion21375	Value: frozenset([1])
FOLLOW_conclusion3_in_conclusion21395	Value: frozenset([1])
FOLLOW_variable_name_in_conclusion31432	Value: frozenset([54])
FOLLOW_54_in_conclusion31434	Value: frozenset([4])
FOLLOW_term_name_in_conclusion31438	Value: frozenset([1])
FOLLOW_56_in_rule1462	Value: frozenset([8])
FOLLOW_Integer_literal_in_rule1464	Value: frozenset([18])
FOLLOW_18_in_rule1466	Value: frozenset([57])
FOLLOW_57_in_rule1468	Value: frozenset([4, 34, 47, 48, 49, 53])
FOLLOW_condition_in_rule1470	Value: frozenset([58])

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Name	Description
FOLLOW_58_in_rule1472	Value: frozenset([4, 34])
FOLLOW_conclusion_in_rule1474	Value: frozenset([20, 59])
FOLLOW_59_in_rule1477	Value: frozenset([8, 9])
FOLLOW_weighting_factor_in_rule1479	Value: frozenset([20])
FOLLOW_20_in_rule1485	Value: frozenset([1])
FOLLOW_numeric_literal_in_weighting_factor1500	Value: frozenset([1])
FOLLOW_Identifier_in_function_block_name1511	Value: frozenset([1])
FOLLOW_Identifier_in_rule_block_name1519	Value: frozenset([1])
FOLLOW_Identifier_in_term_name1527	Value: frozenset([1])
FOLLOW_Identifier_in_f_v_variable_name1535	Value: frozenset([1])
FOLLOW_Identifier_in_variable_name1543	Value: frozenset([1])
FOLLOW_set_in_numeric_literal0	Value: frozenset([1])
<i>Inherited from antlr3.recognizers.BaseRecognizer</i> DEFAULT_TOKEN_CHANNEL, HIDDEN, MEMO_RULE_FAILED, MEMO_RULE_UNKNOWN	

99 Module *fuzzy.storage.fcl.Reader*

99.1 Variables

Name	Description
<code>__revision__</code>	Value: '\$Id: Reader.py,v 1.3 2009/08/31 21:02:06 rliebscher Exp \$'

99.2 Class Reader

object └─ **fuzzy.storage.fcl.Reader.Reader**

Parses a FCL file to a *fuzzy.System.System* instance

99.2.1 Methods

`__init__(self)`

`x.__init__(...)` initializes `x`; see `x.__class__.__doc__` for signature
 Overrides: `object.__init__` extit(inherited documentation)

`load_from_file(self, filename)`

`load_from_stream(self, stream)`

`load_from_string(self, str)`

Inherited from object

`__delattr__()`, `__getattr__()`, `__hash__()`, `__new__()`, `__reduce__()`, `__reduce_ex__()`,
`__repr__()`, `__setattr__()`, `__str__()`

99.2.2 Properties

Name	Description
<i>Inherited from object</i>	
<code>__class__</code>	

100 Module fuzzy.utils

Helper functions for pyfuzzy.

100.1 Functions

prop(*func*)

Function decorator for defining property attributes

The decorated function is expected to return a dictionary containing one or more of the following pairs:

- fget - function for getting attribute value
- fset - function for setting attribute value
- fdel - function for deleting attribute

This can be conveniently constructed by the locals() builtin function; see: <http://aspn.activestate.com/ASPN/Cookbook/Python/Recipe/205183>

checkRange(*value, ranges*)

Checks if the value is in the defined range.

The range definition is a list/iterator from:

- float values belonging to the defined range $x \in \{a\}$
- 2-tuples of two floats which define a range not including the tuple values itself $x \in]a,b[$
- 2-list of two floats which define a range including the list values $x \in [a,b]$

The order of elements is not important. So could define the set of integer numbers by a generator returning the following sequence: $0, 1, -1, 2, -2, 3, -3, \dots$

It returns True if the value is in one of the defined ranges. Otherwise it returns false.

100.2 Variables

Name	Description
__revision__	Value: '\$Id: utils.py,v 1.5 2009/10/07 21:08:12 rliebscher Exp \$'
inf	Value: inf

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Name	Description
inf_p	Value: inf
inf_n	Value: -inf

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