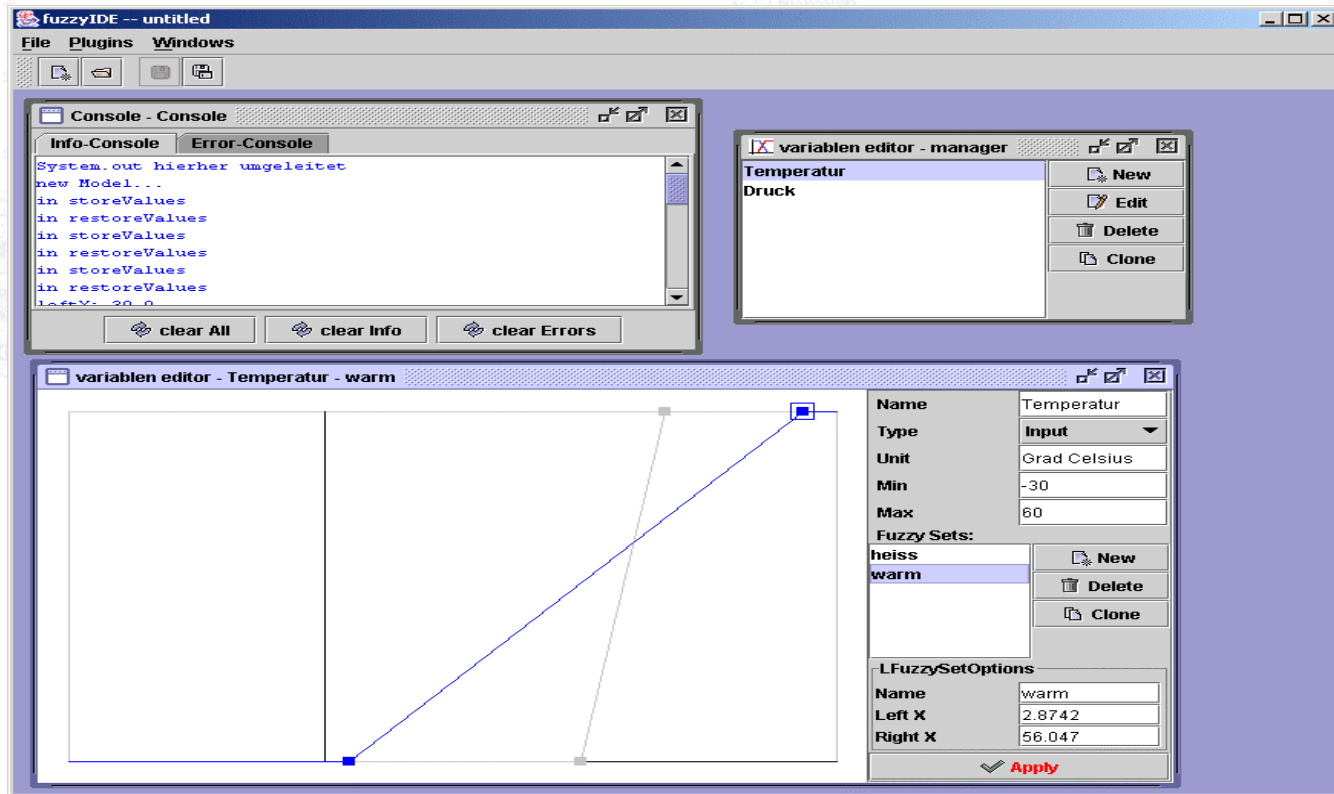


fuzzyIDE start

Willkommen zur Projektpräsentation



fuzzyIDE idee

- Fuzzy Steuerung für den „Kepera“
- Nutzung des „NRC FuzzyJ Toolkit“
- Problem:
 - umständliche Eingabe der Systemparameter
- Lösung:
 - grafische Eingabeschnittstelle

fuzzyIDE idee

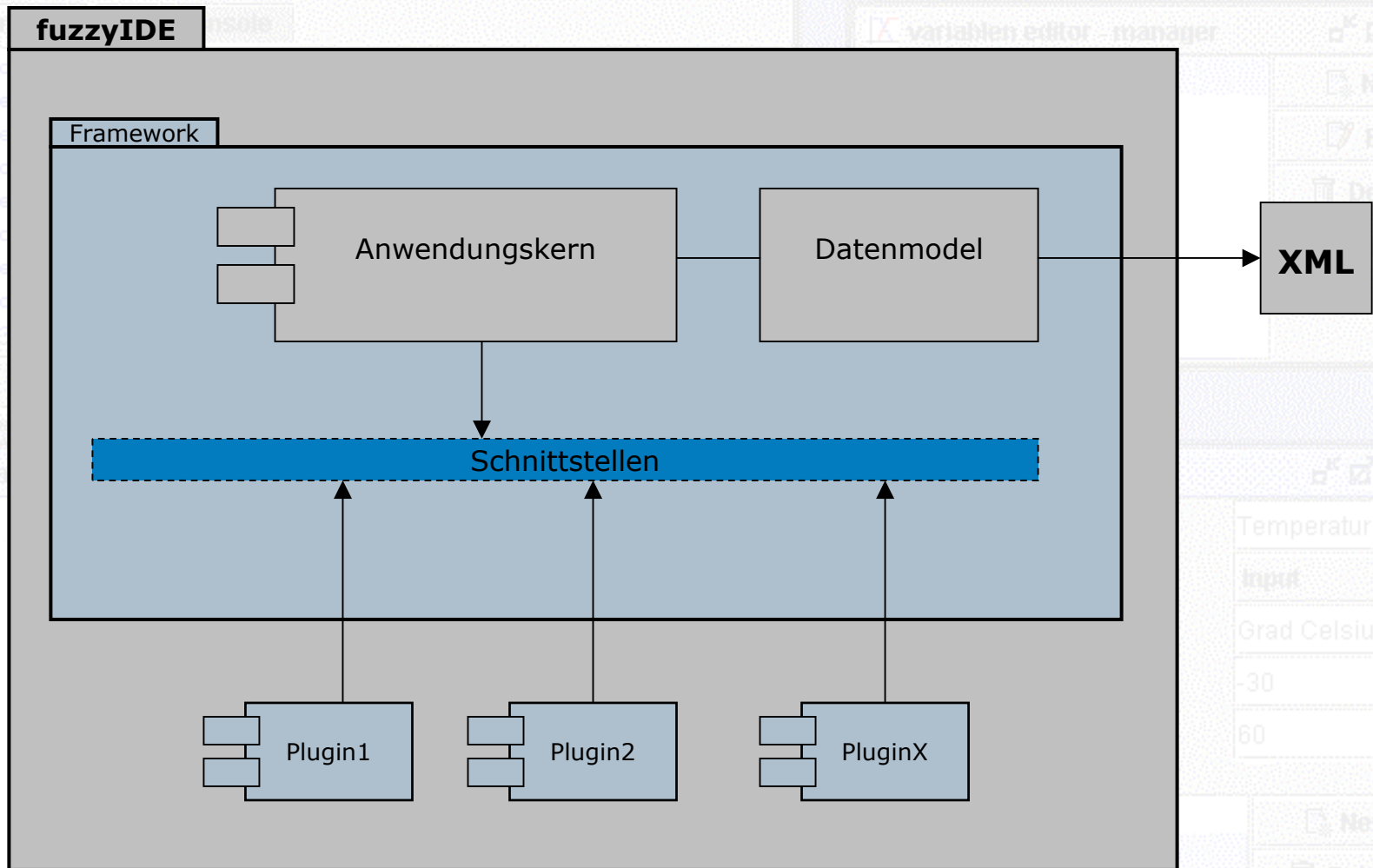
Problem:

- hoher Funktionsumfang

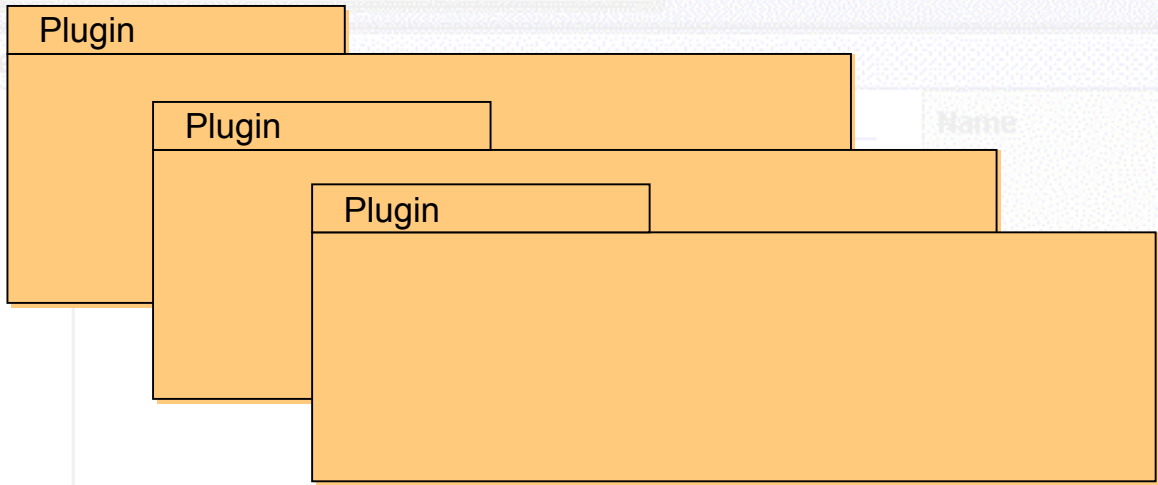
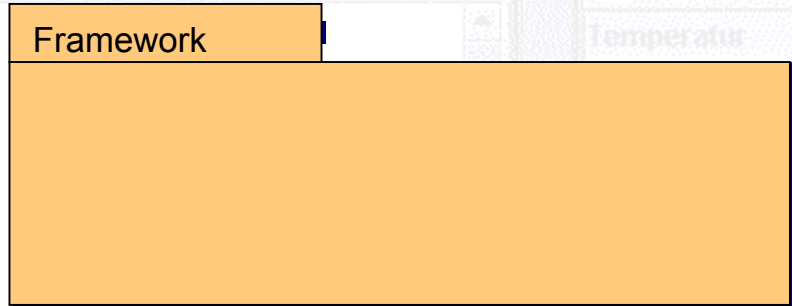
Lösung:

- Bereitstellen eines Frameworks
- Funktionalität durch Plugins
- Definition einer Datenbasis

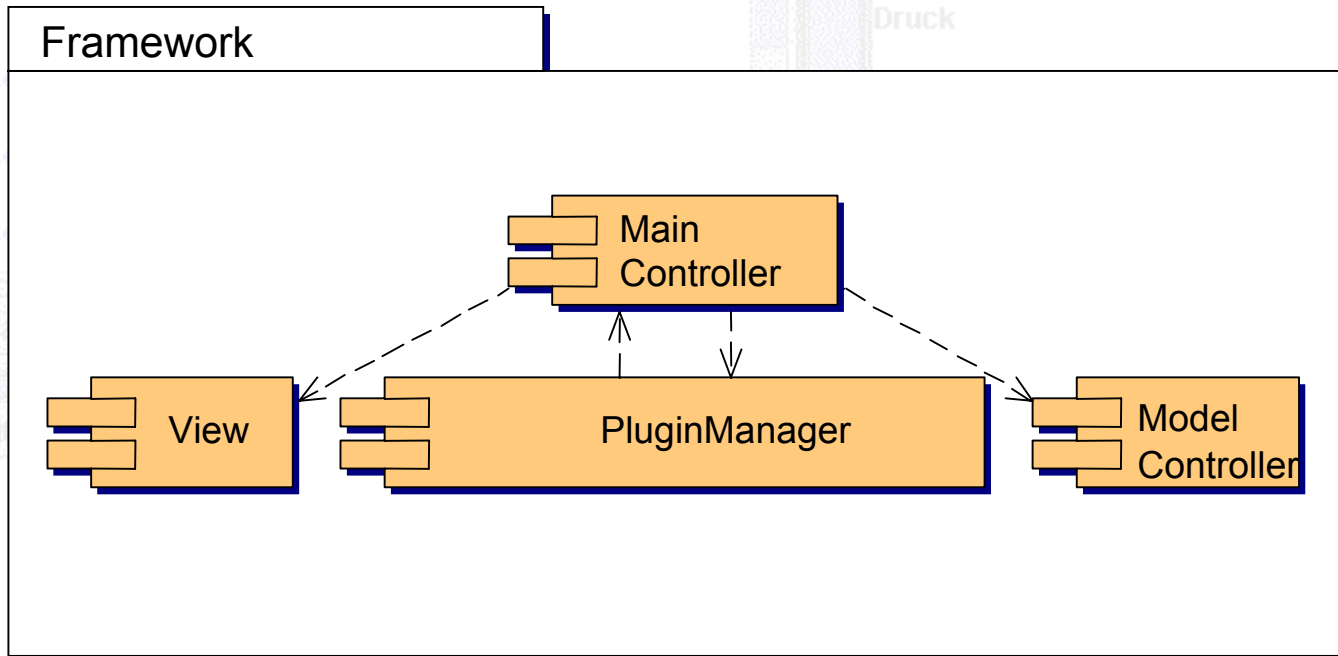
fuzzyIDE systemarchitektur



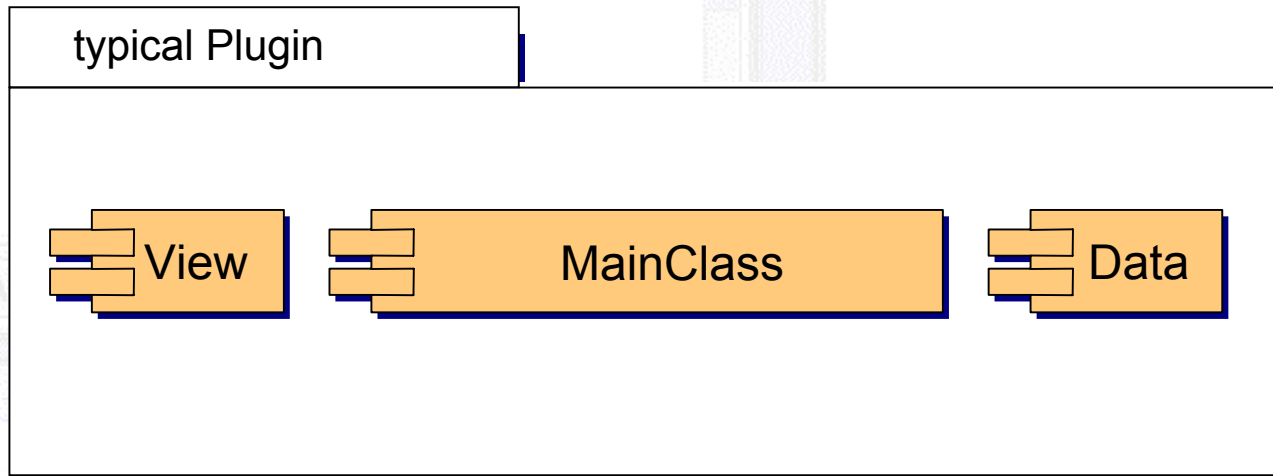
fuzzyIDE components



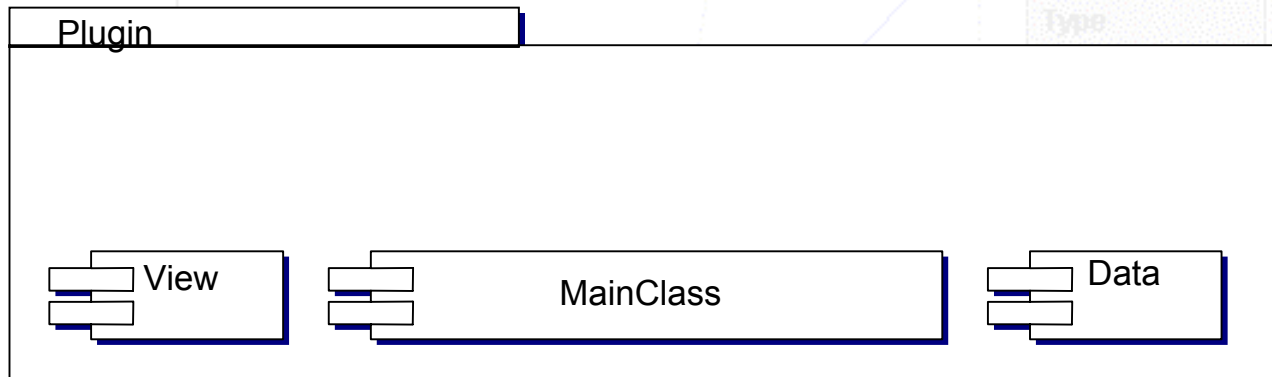
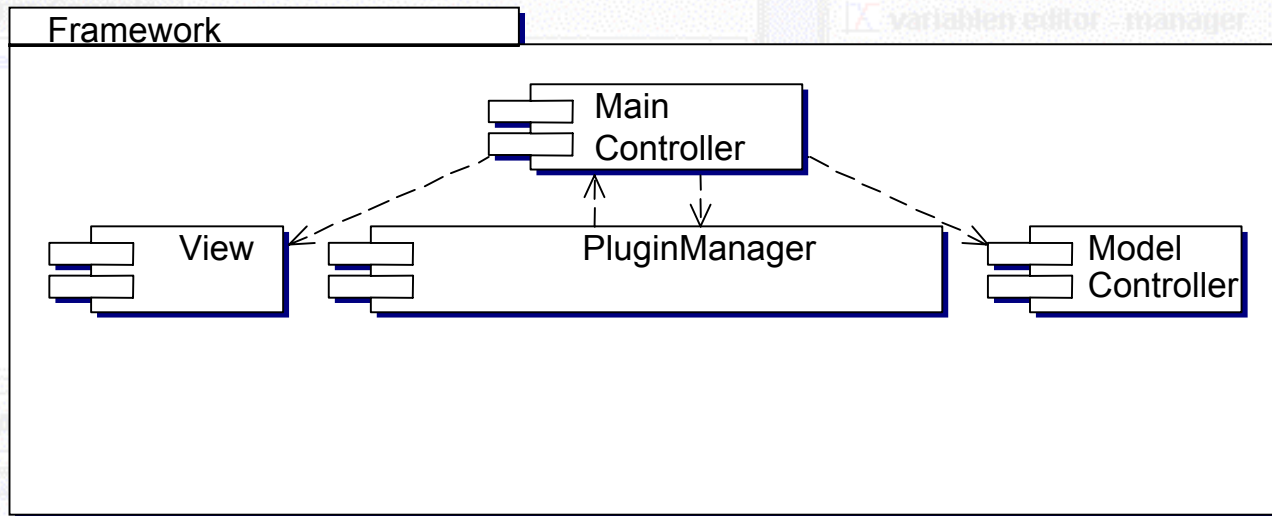
fuzzyIDE components



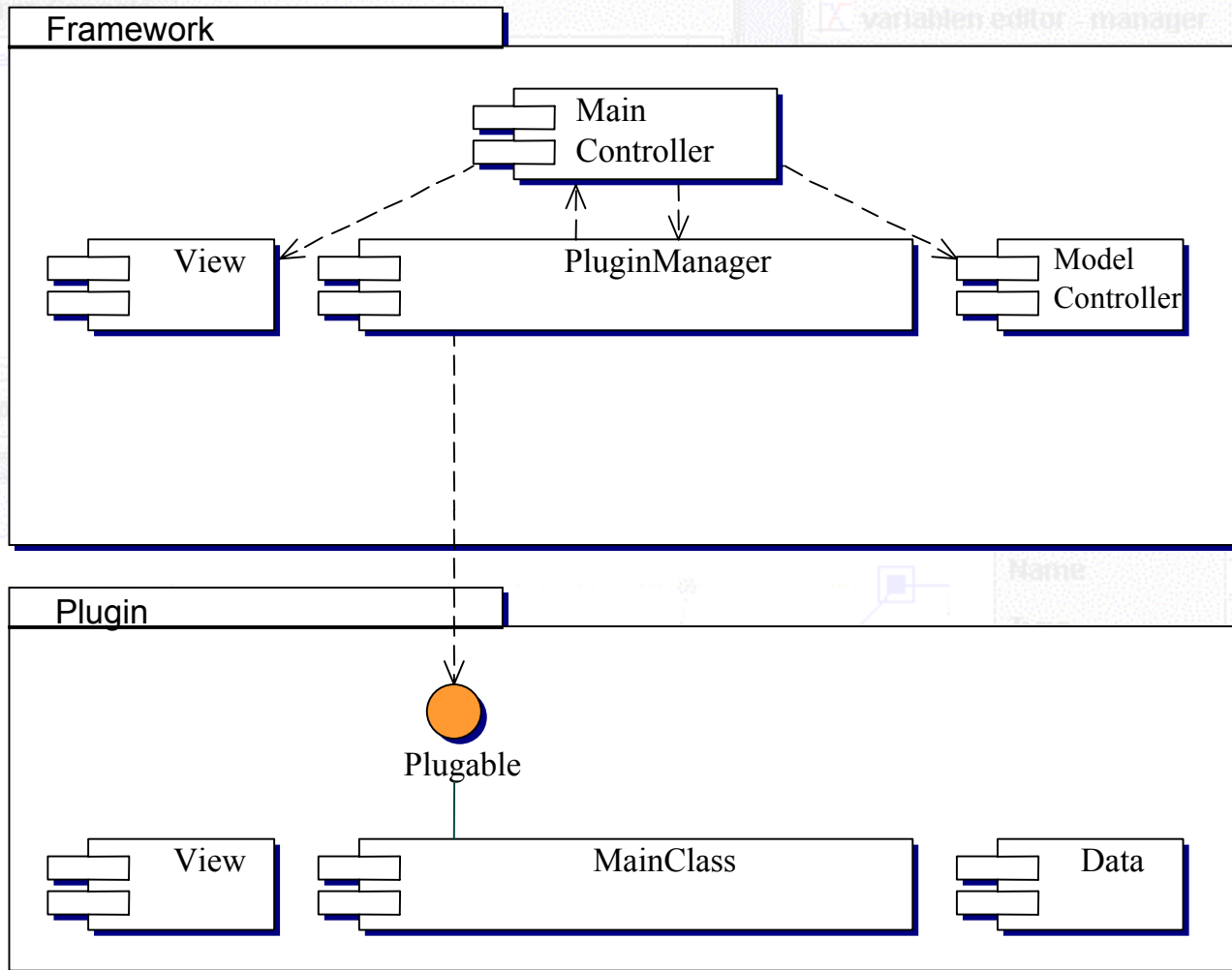
fuzzyIDE components



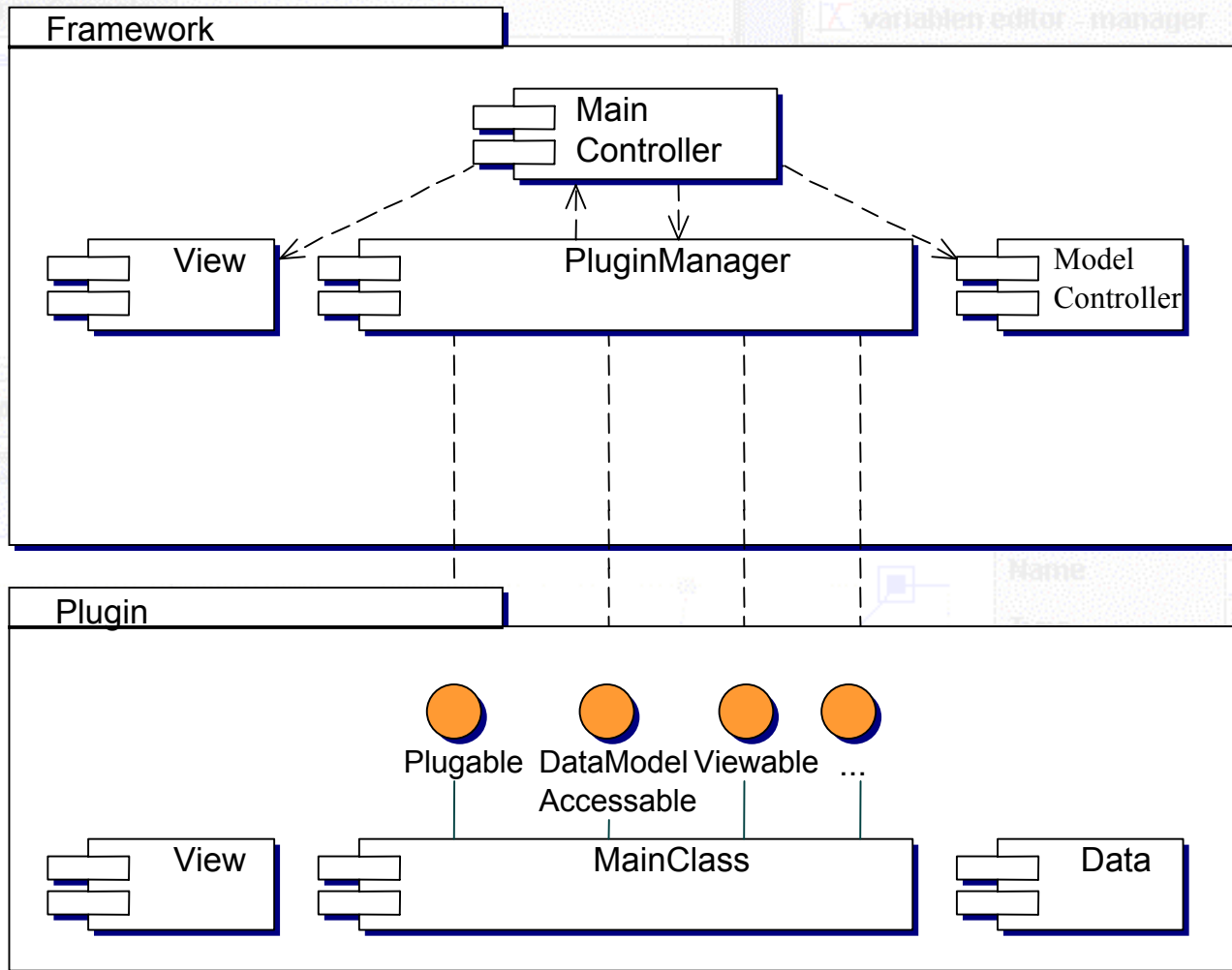
fuzzyIDE two worlds



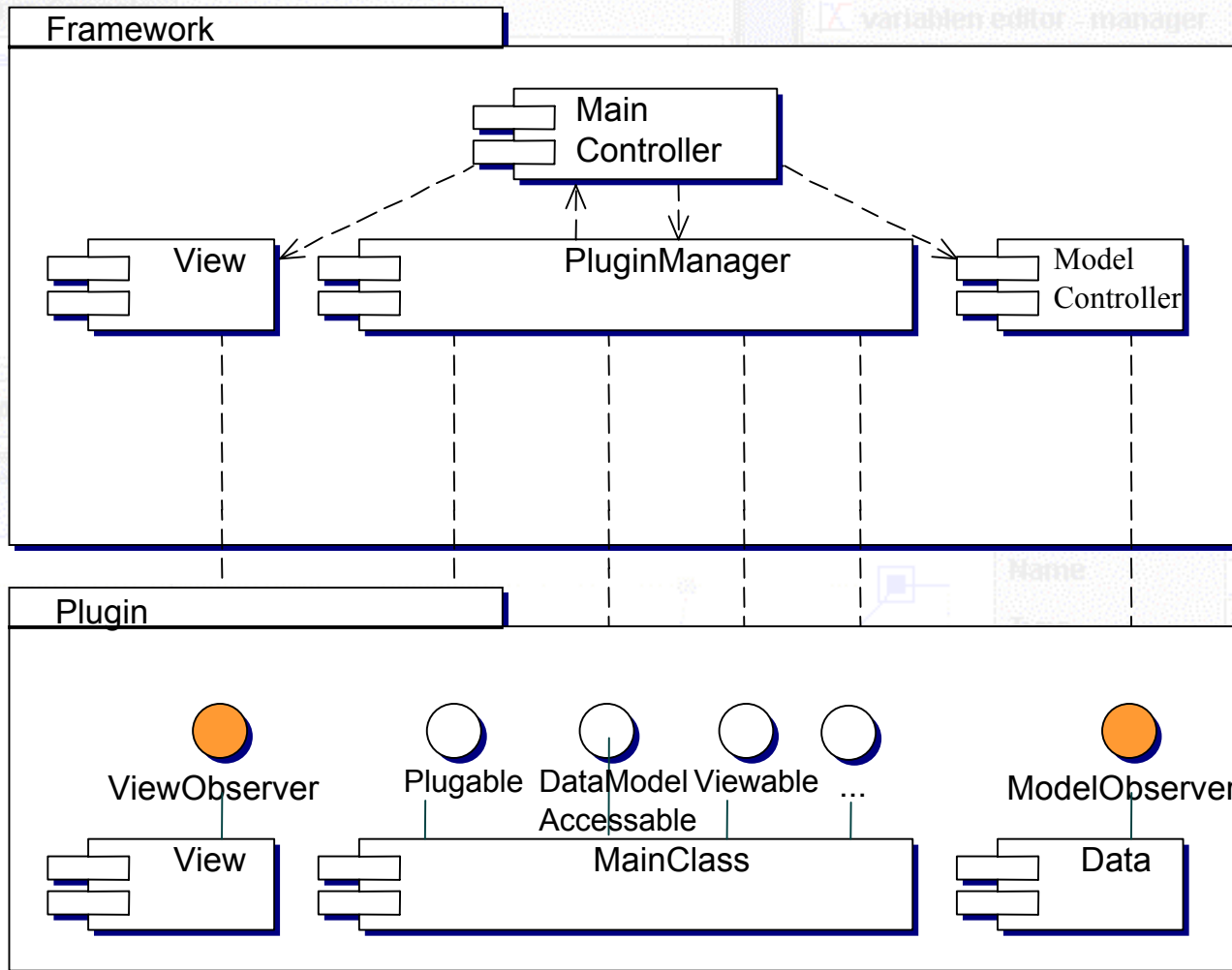
fuzzyIDE the interfaces



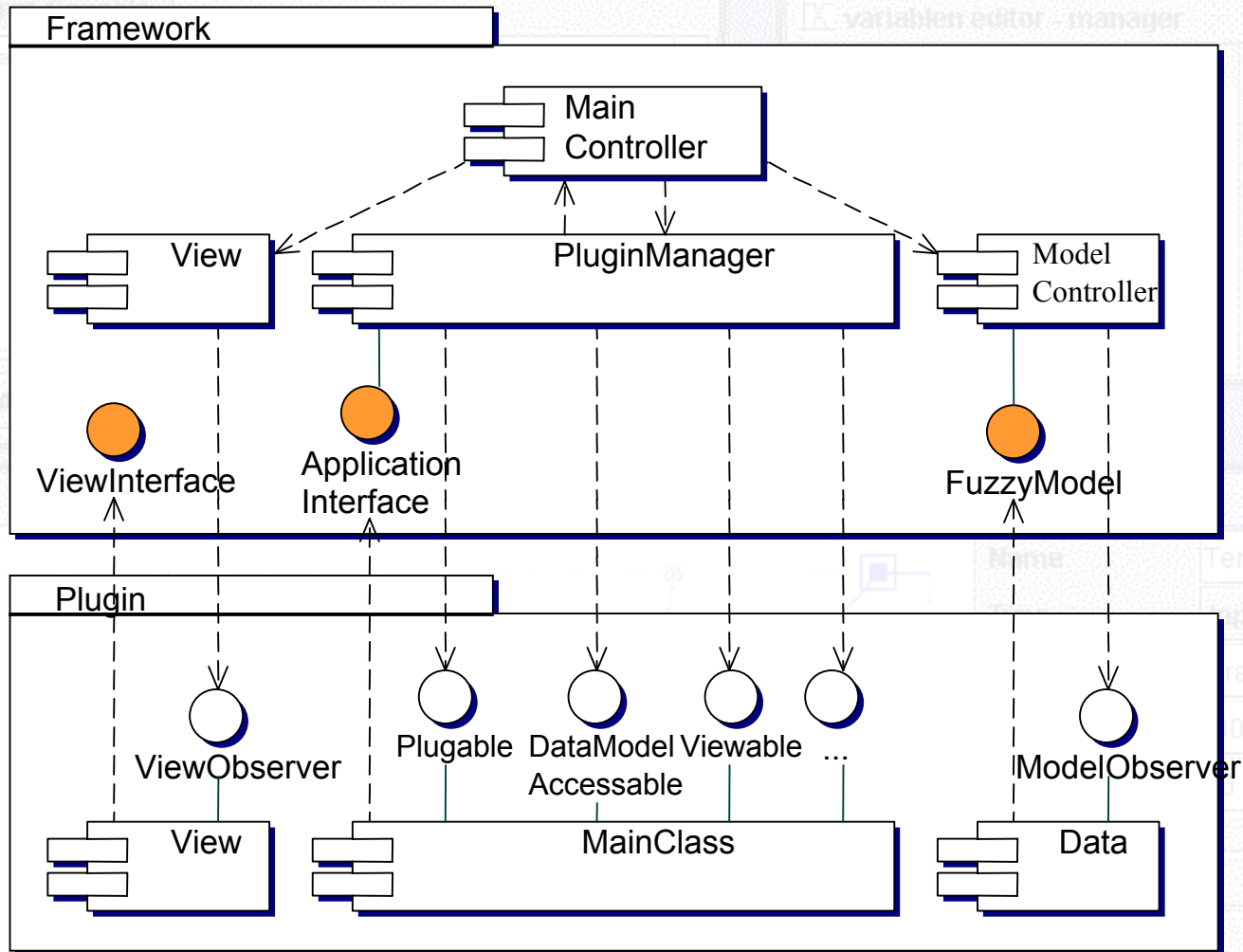
fuzzyIDE the interfaces



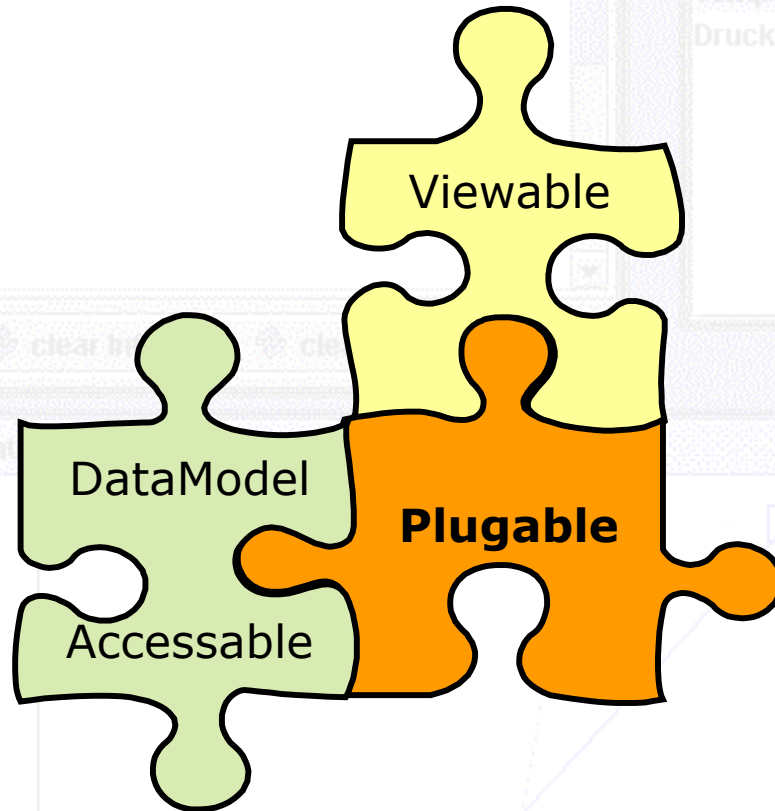
fuzzyIDE the interfaces



fuzzyIDE the interfaces

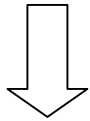


fuzzyIDE interface lego

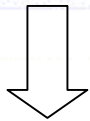


fuzzyIDE sequences

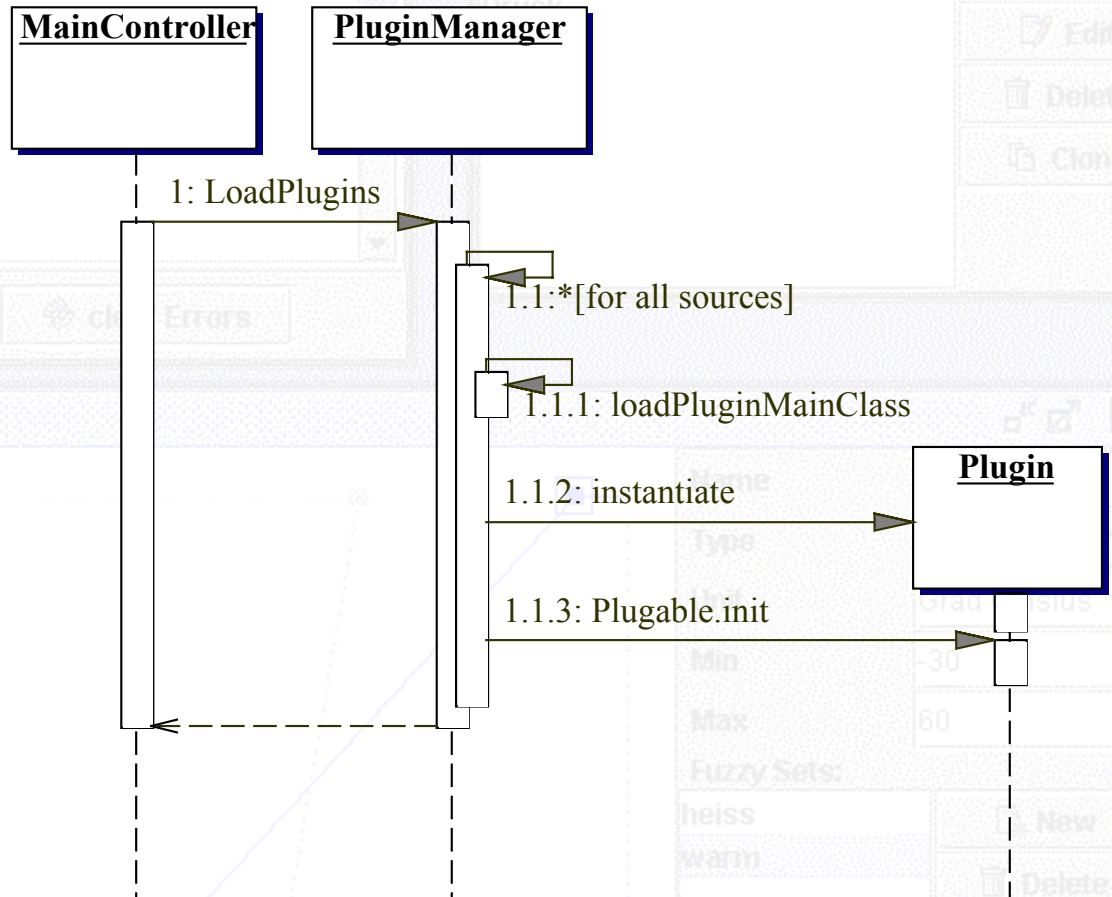
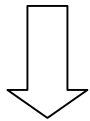
1



2



3



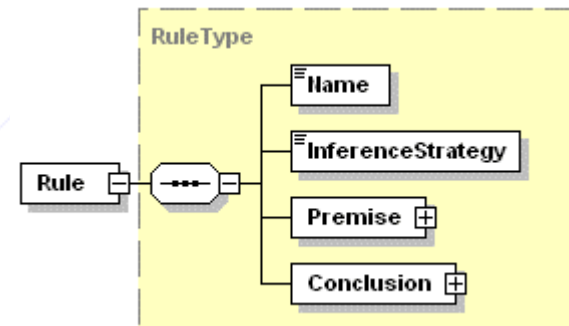
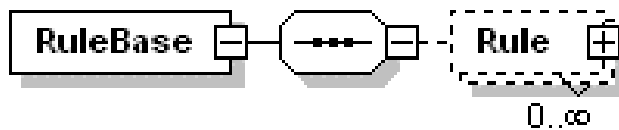
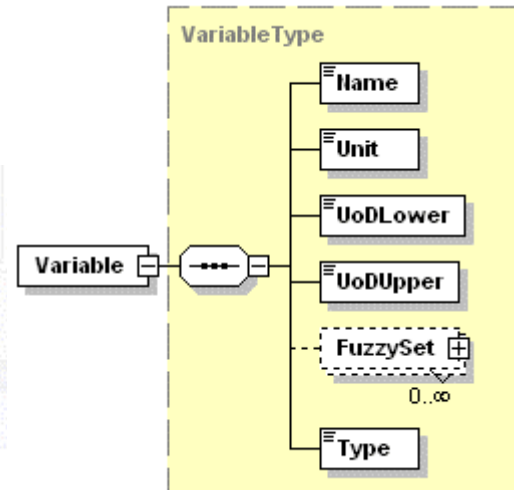
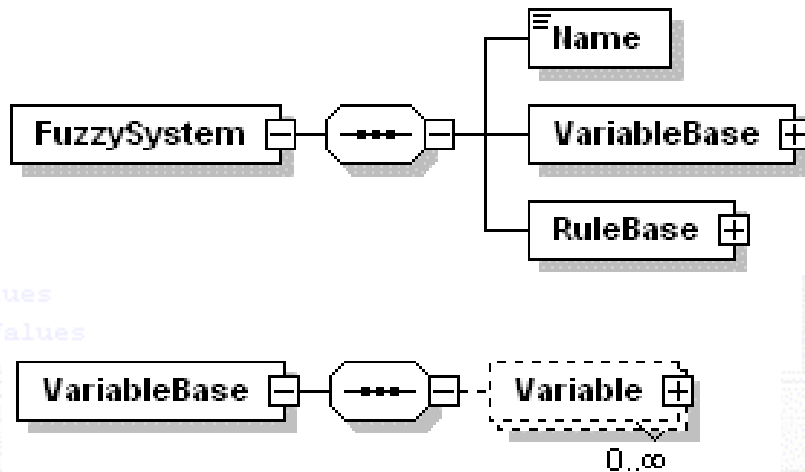
fuzzyIDE XML-Datenbasis

- Weiterverarbeitbarkeit
- Universalität
- Erweiterbarkeit
- einfache Modellierung mit XML-Schema

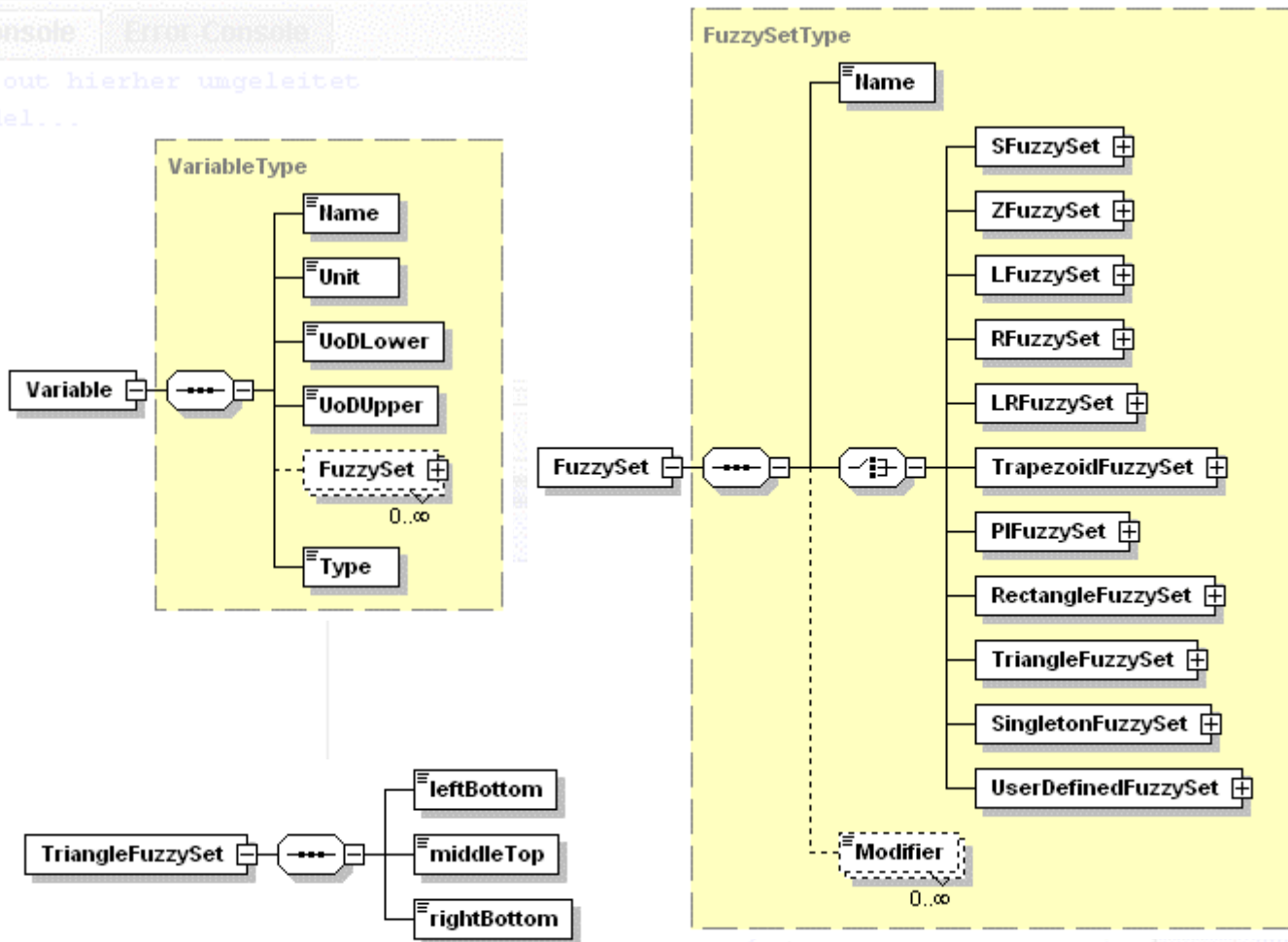
fuzzyIDE XML-unsere Motivation

- Pluginprogrammierer von XML „verschonen“
- einfachen Zugriff zu allen Daten bieten
- auf Zusatzbibliotheken verzichten
- keine Klassengenerierung über XSD

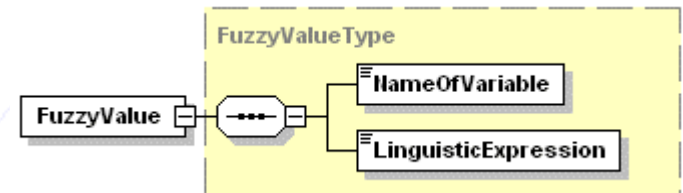
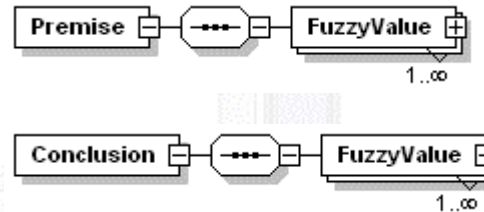
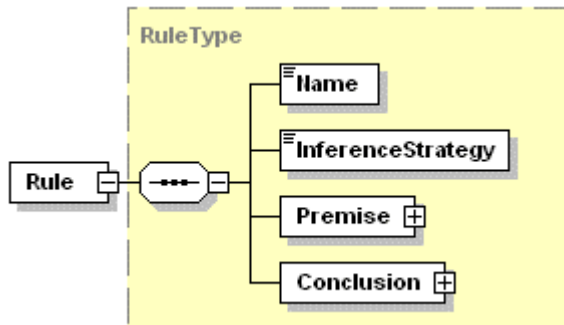
fuzzyIDE XML - Schema



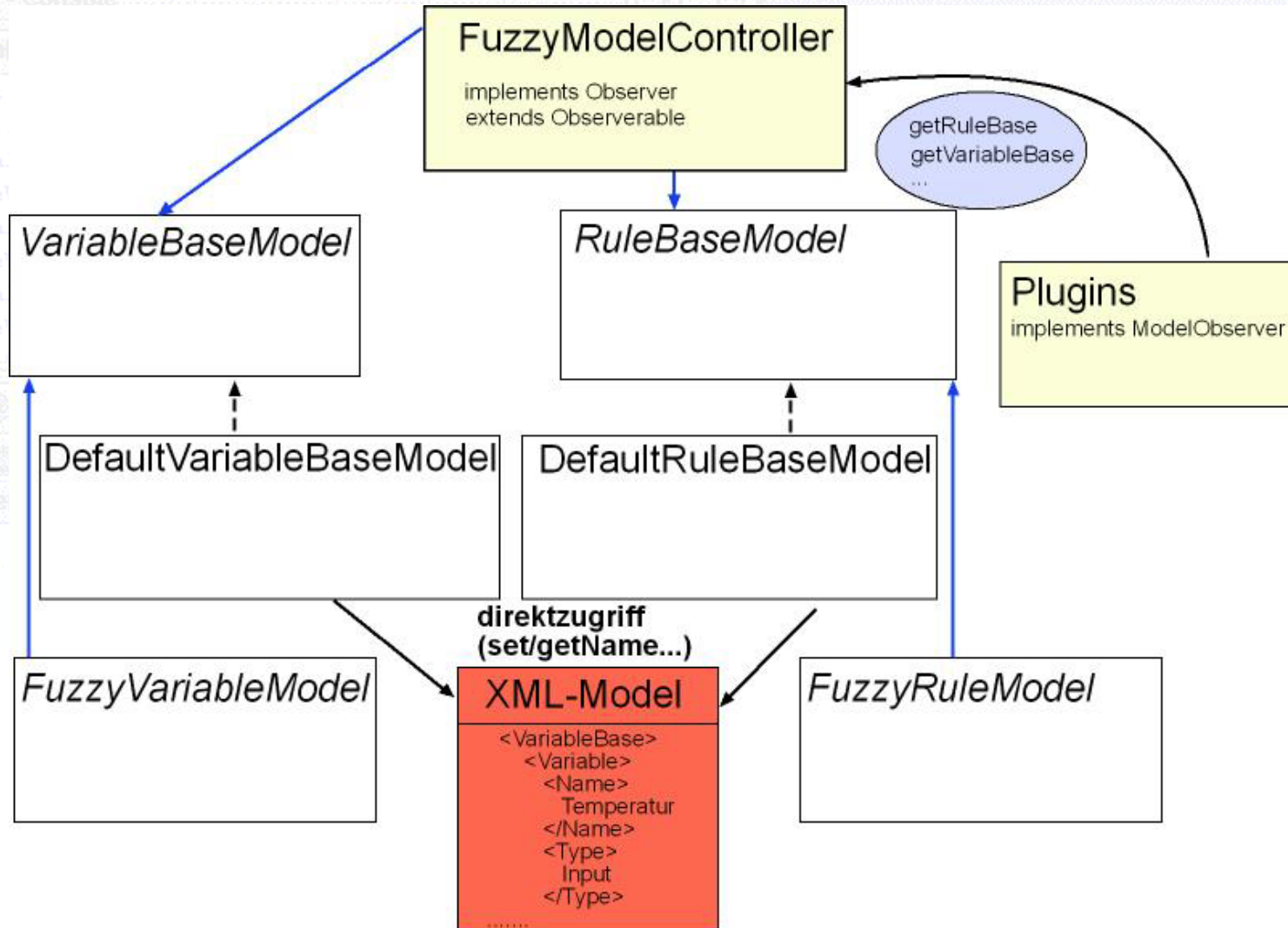
fuzzyIDE XML - Schema



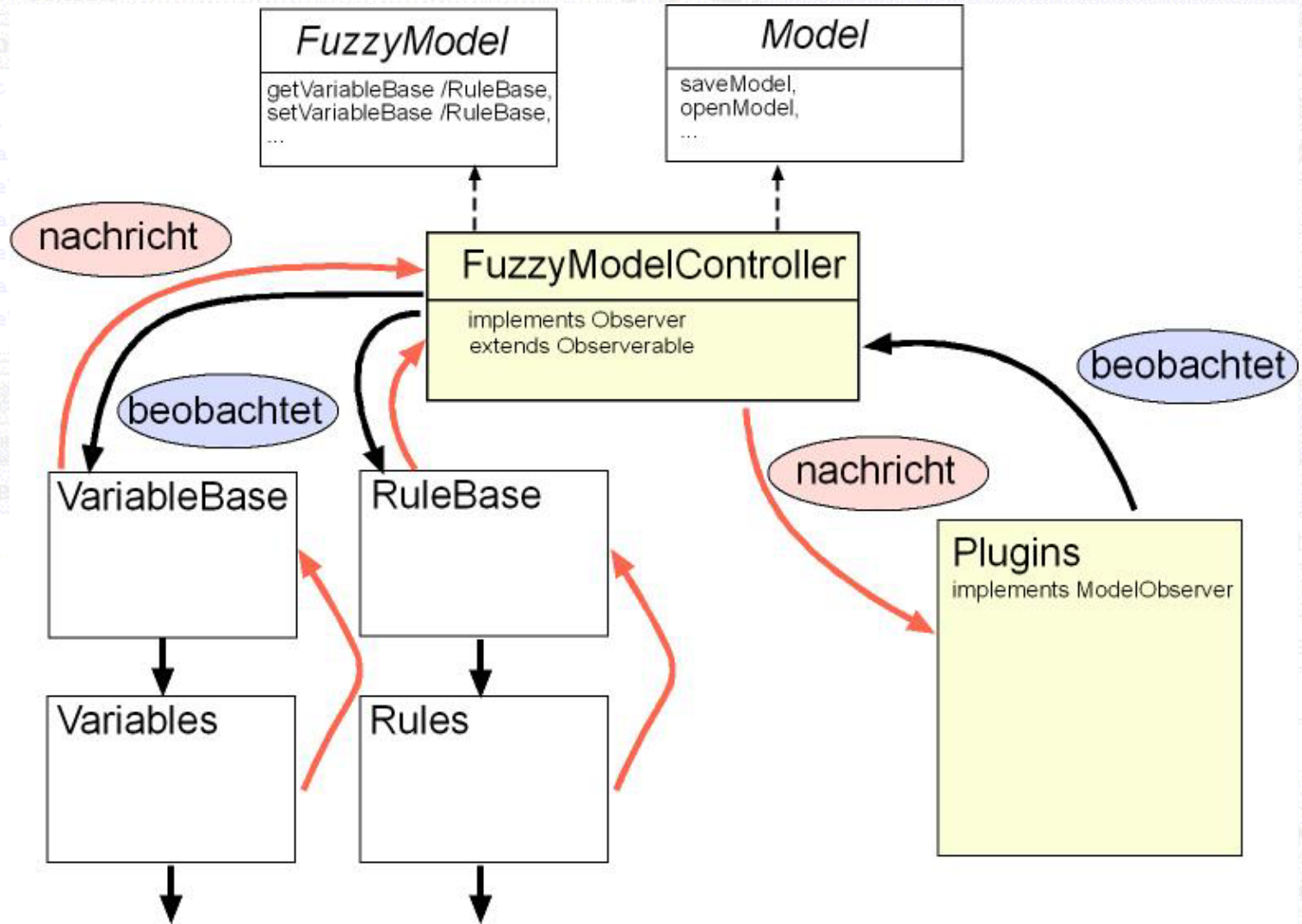
fuzzyIDE XML - Schema



fuzzyIDE XML - Implementierung

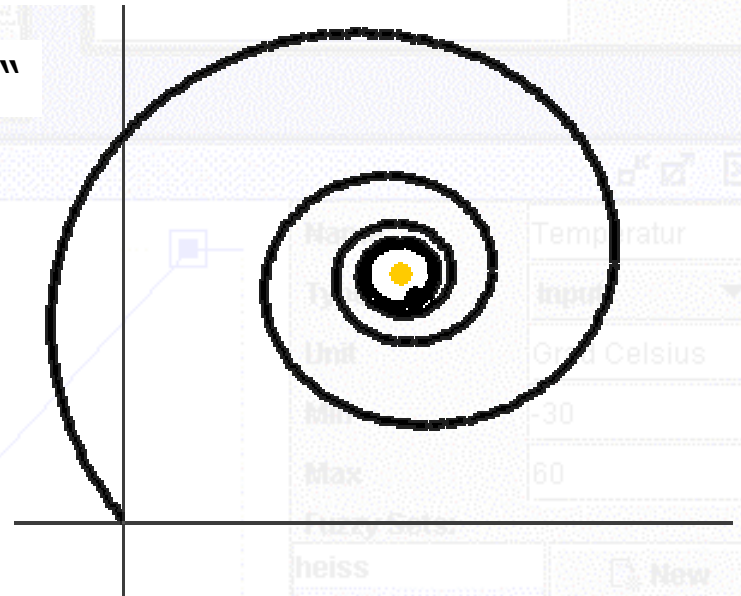


fuzzyIDE ModelController

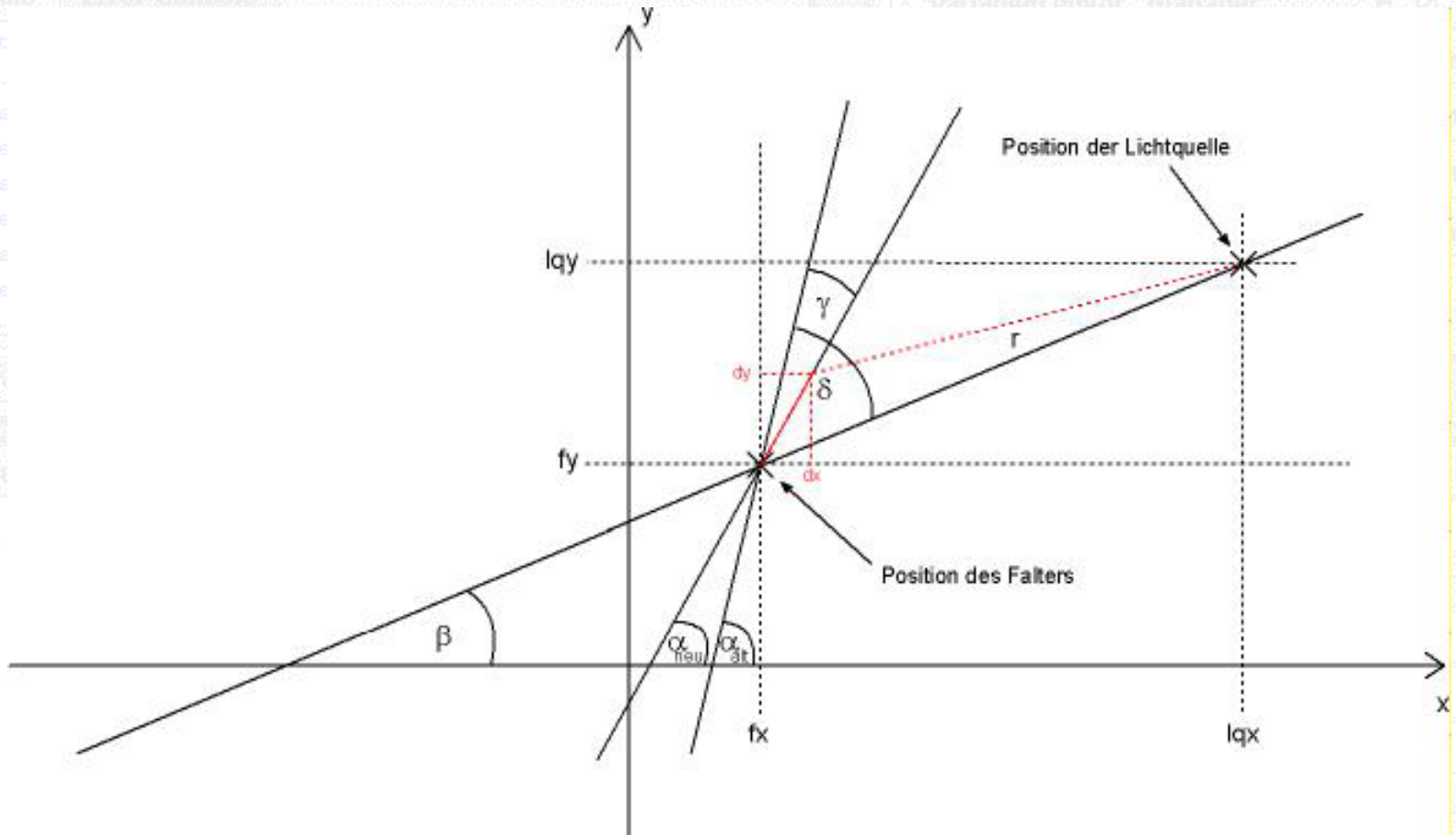


fuzzyIDE Falter Plugin

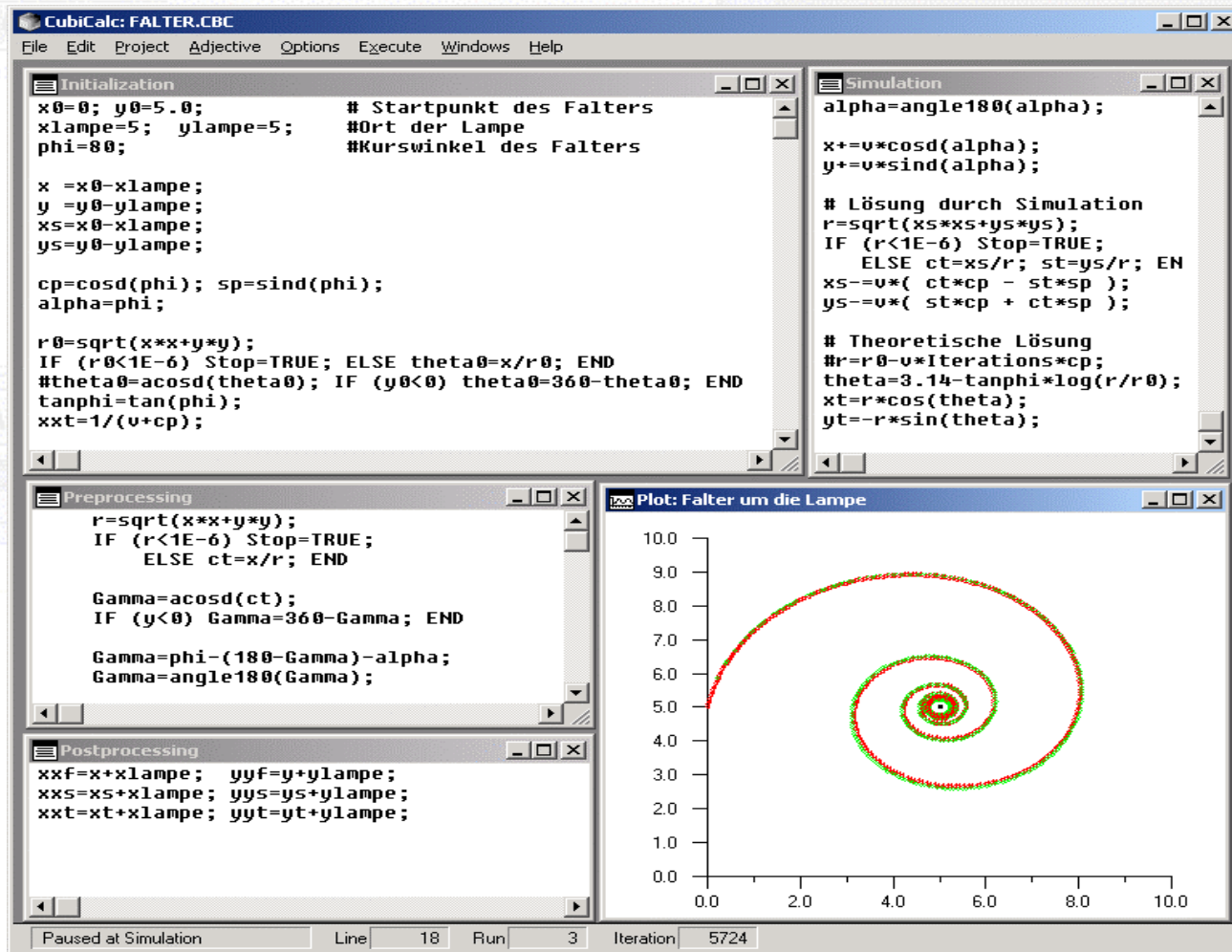
- eine Lichtquelle zu.
- Trackingproblem
- Lösung basiert auf einem FuzzySystem
- Nutzung des „NRC FuzzyJ Toolkit“



fuzzyIDE Falter Plugin



fuzzyIDE Falter Plugin



The screenshot displays the fuzzyIDE environment with the following components:

- Initialization:**

```
x0=0; y0=5.0; # Startpunkt des Falters
xlampe=5; ylampe=5; #Ort der Lampe
phi=80; #Kurswinkel des Falters

x =x0-xlampe;
y =y0-ylampe;
xs=x0-xlampe;
ys=y0-ylampe;

cp=cosd(phi); sp=sind(phi);
alpha=phi;

r0=sqrt(x*x+y*y);
IF (r0<1E-6) Stop=TRUE; ELSE theta0=x/r0; END
#theta0=acosd(theta0); IF (y<0) theta0=360-theta0; END
tanphi=tan(phi);
xxt=1/(v+cp);
```
- Simulation:**

```
alpha=angle180(alpha);

x+=v*cosd(alpha);
y+=v*sind(alpha);

# Lösung durch Simulation
r=sqrt(xs*xs+ys*ys);
IF (r<1E-6) Stop=TRUE;
ELSE ct=xs/r; st=ys/r; EN
xs=-v*( ct*cp - st*sp );
ys=-v*( st*cp + ct*sp );

# Theoretische Lösung
#r=r0-v*Iterations*cp;
theta=3.14-tanphi*log(r/r0);
xt=r*cos(theta);
yt=-r*sin(theta);
```
- Preprocessing:**

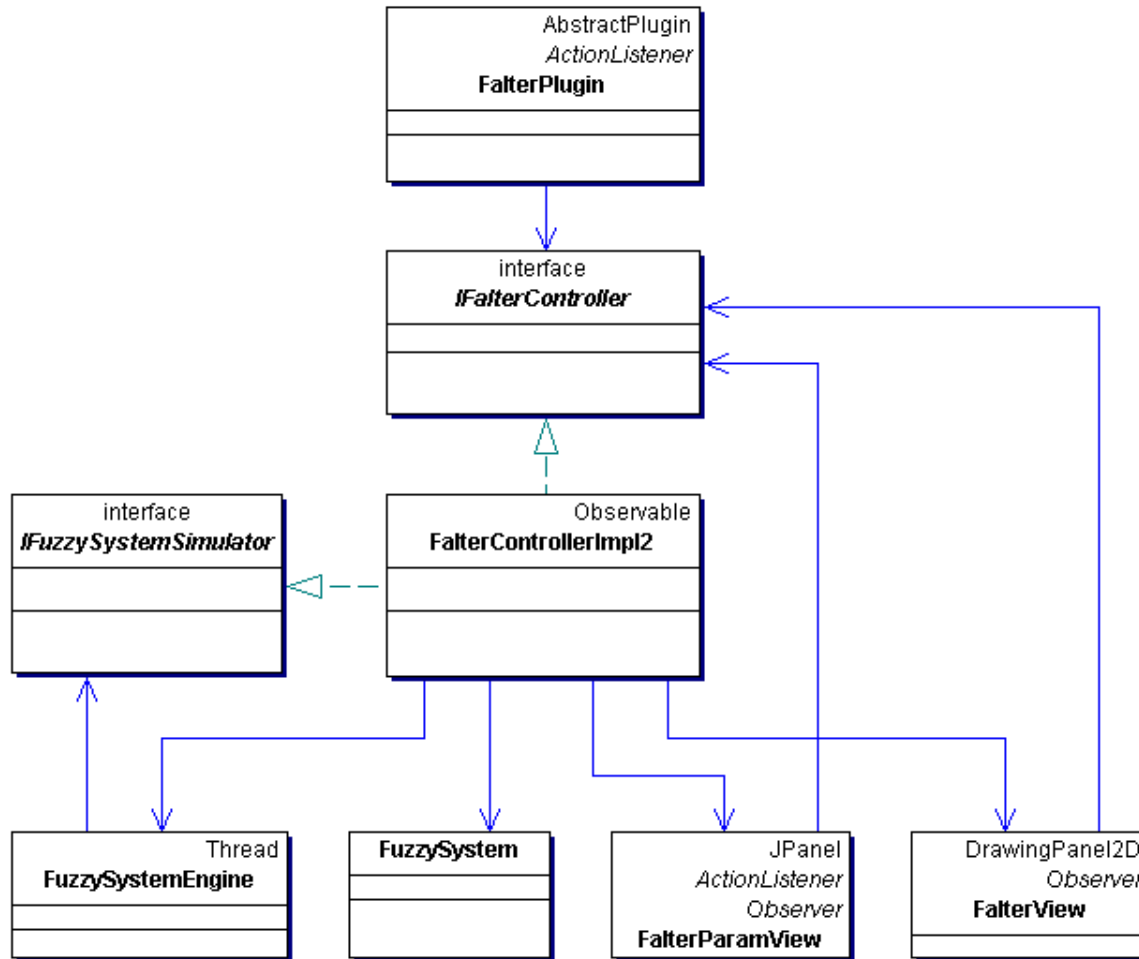
```
r=sqrt(x*x+y*y);
IF (r<1E-6) Stop=TRUE;
ELSE ct=x/r; END

Gamma=acosd(ct);
IF (y<0) Gamma=360-Gamma; END

Gamma=phi-(180-Gamma)-alpha;
Gamma=angle180(Gamma);
```
- Postprocessing:**

```
xxf=x+xlampe; yyf=y+ylampe;
xxs=xs+xlampe; yys=ys+ylampe;
xxt=xt+xlampe; yyt=yt+ylampe;
```
- Plot: Falter um die Lampe:** A 2D plot showing a spiral path starting from (0, 5) and winding around a central point (5, 5). The axes range from 0.0 to 10.0.
- Status Bar:** Paused at Simulation, Line 18, Run 3, Iteration 5724.

fuzzyIDE Falter Plugin



fuzzyIDE

Falter Plugin



FuzzySystem des Falters

gamma

delta

Regelbasis

fuzzyIDE Falter Plugin

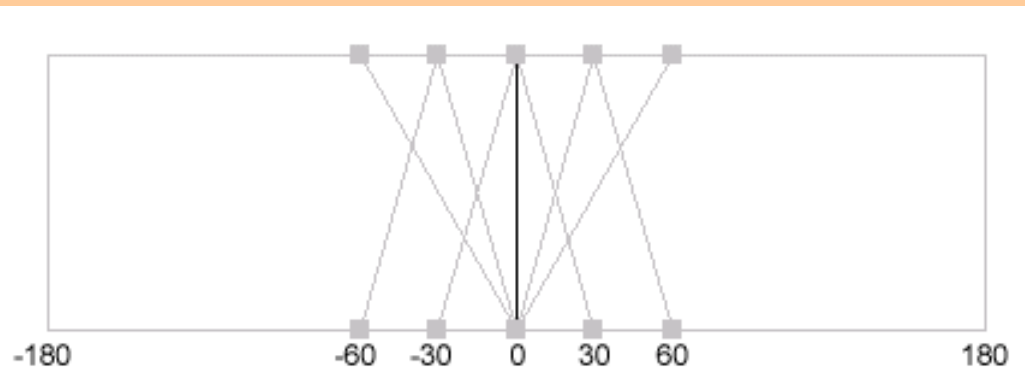
FuzzySystem des Falters

gamma

delta

Regelbasis

- Inputvariable
- 5 Ausprägungen



fuzzyIDE Falter Plugin

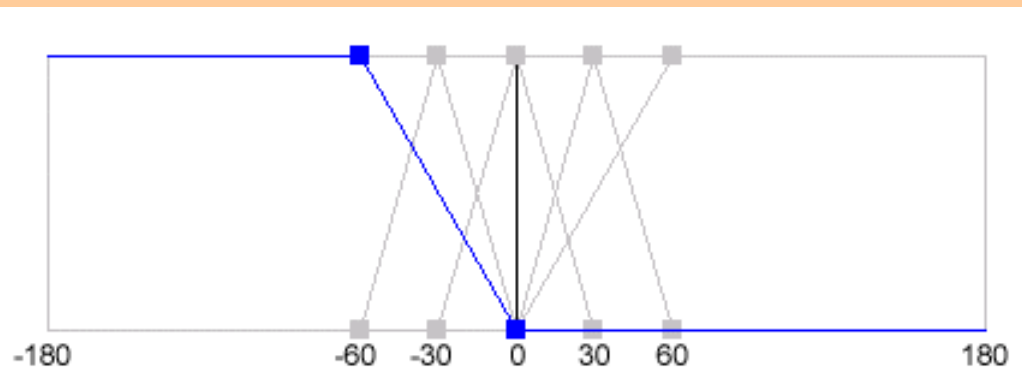
FuzzySystem des Falters

gamma

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Regelbasis

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fuzzyIDE Falter Plugin

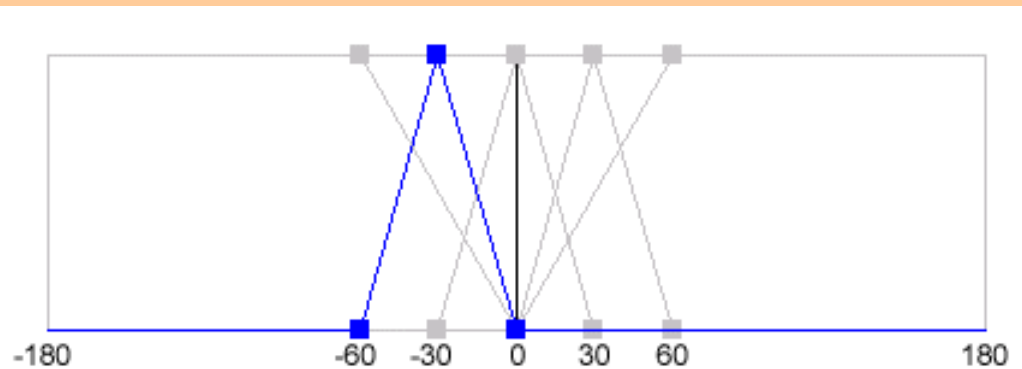
FuzzySystem des Falters

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Regelbasis

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- 5 Ausprägungen



fuzzyIDE Falter Plugin

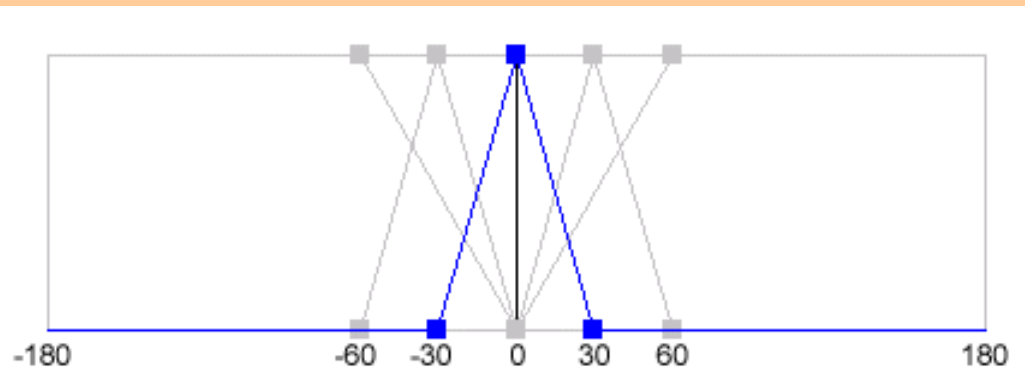
FuzzySystem des Falters

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Regelbasis

- Inputvariable
- 5 Ausprägungen



fuzzyIDE

Falter Plugin



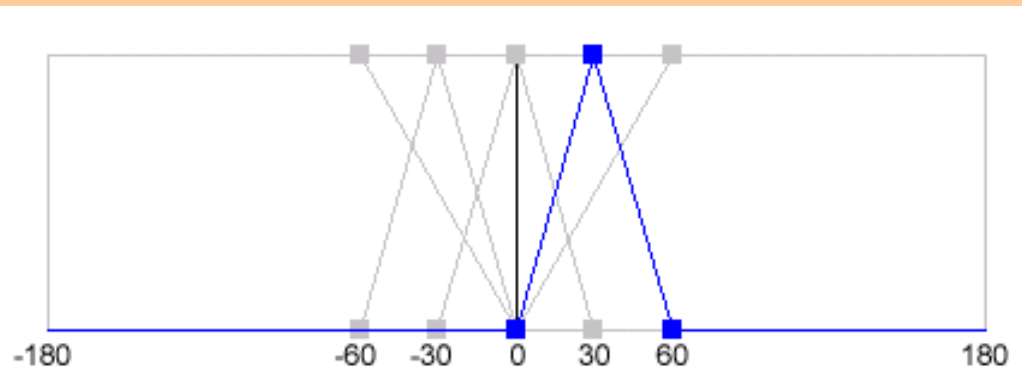
FuzzySystem des Falters

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Regelbasis

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fuzzyIDE Falter Plugin

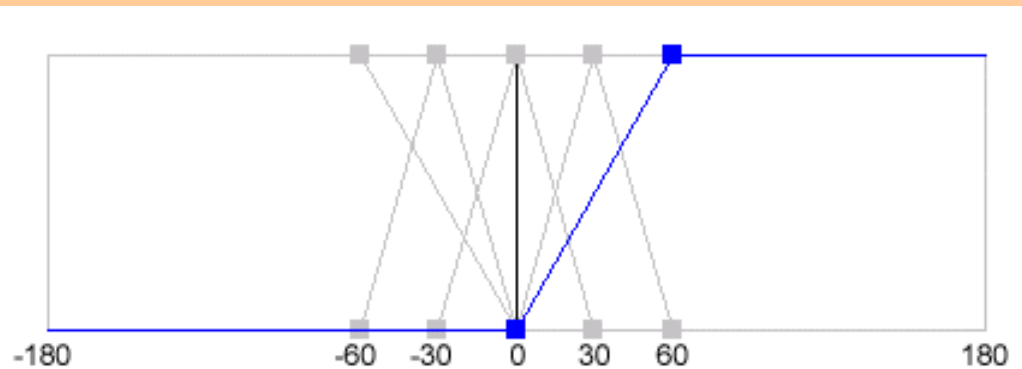
FuzzySystem des Falters

gamma

delta

Regelbasis

- Inputvariable
- 5 Ausprägungen



fuzzyIDE

Falter Plugin



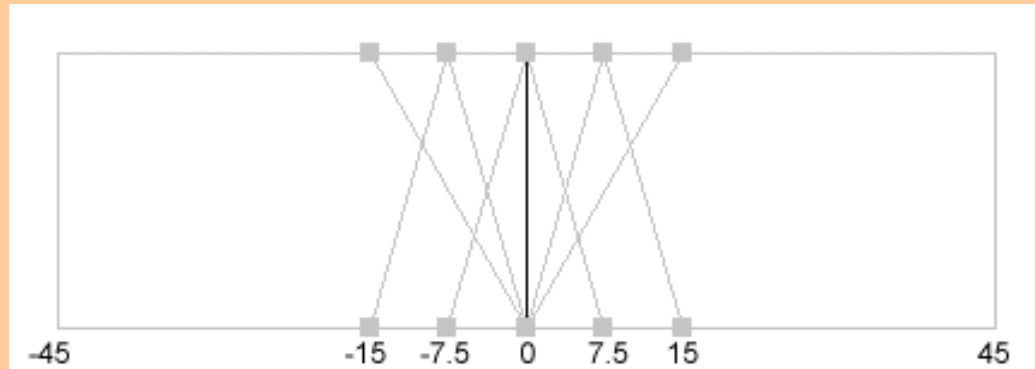
FuzzySystem des Falters

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Regelbasis

- Outputvariable
- 5 Ausprägungen



fuzzyIDE

Falter Plugin



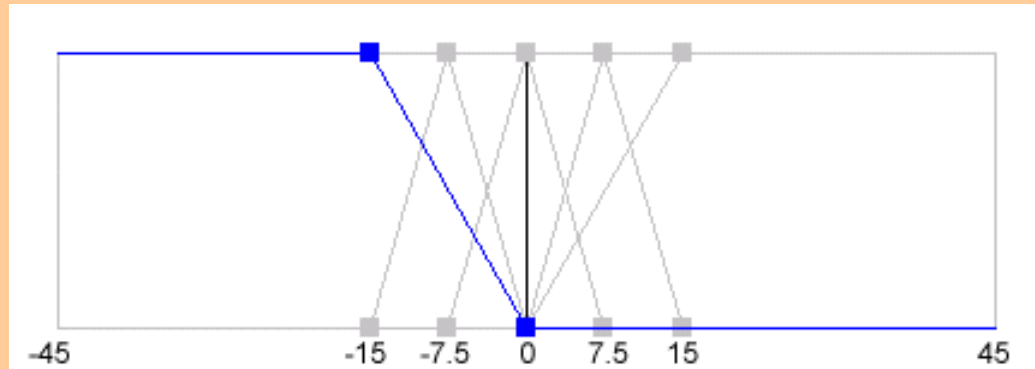
FuzzySystem des Falters

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Regelbasis

- Outputvariable
- 5 Ausprägungen



fuzzyIDE Falter Plugin

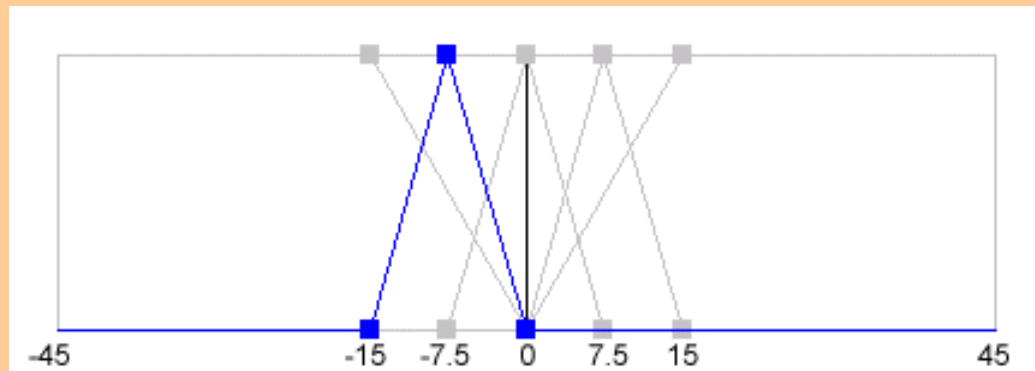
FuzzySystem des Falters

gamma

delta

Regelbasis

- Outputvariable
- 5 Ausprägungen



fuzzyIDE Falter Plugin

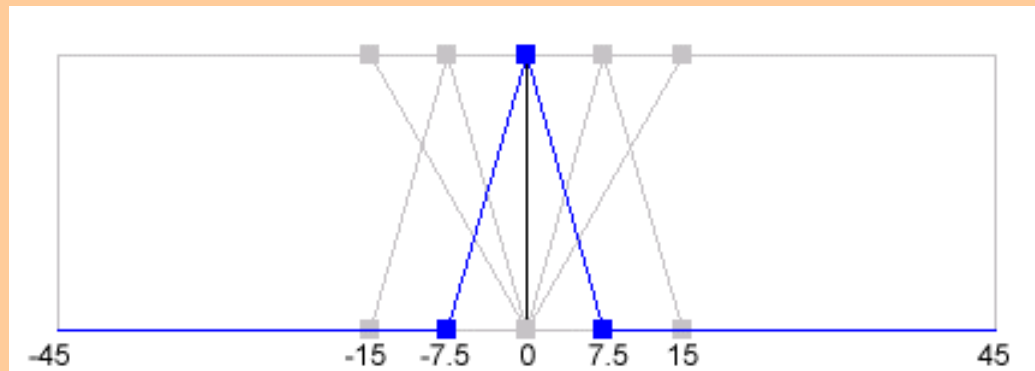
FuzzySystem des Falters

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Regelbasis

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fuzzyIDE

Falter Plugin



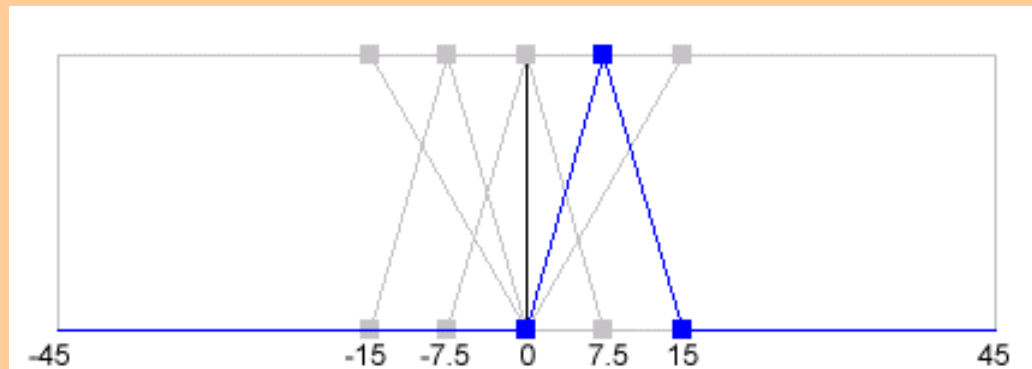
FuzzySystem des Falters

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fuzzyIDE Falter Plugin

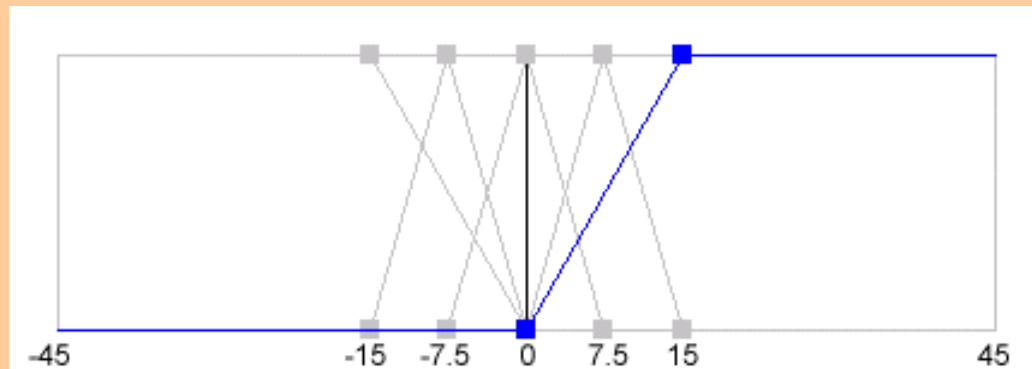
FuzzySystem des Falters

gamma

delta

Regelbasis

- Outputvariable
- 5 Ausprägungen



fuzzyIDE Falter Plugin

FuzzySystem des Falters

gamma

delta

Regelbasis

- hier werden 5 einfache Regeln definiert:

```
IF gamma IS NL then delta IS NL
```

```
IF gamma IS NS then delta IS NL
```

```
IF gamma IS Z then delta IS Z
```

```
IF gamma IS PS then delta IS PS
```

```
IF gamma IS PL then delta IS PL
```

fuzzyIDE NRC FuzzyJ Toolkit

- „National Research Council of Canada“
- Java Klassenbibliothek
- kapselt die Mathematik der „Fuzzy Logic“
- Fuzzy Variablen, Fuzzy Rules, Fuzzy Sets,...
- einfacher Umgang

fuzzyIDE ende

<http://iwaps1.informatik.htw-dresden.de:8080/Robotics/FuzzyIDE>