



# EFDA

EUROPEAN FUSION DEVELOPMENT AGREEMENT

Task Force  
INTEGRATED TOKAMAK MODELLING

5/05/2009

## Exercises

B. Guillerminet

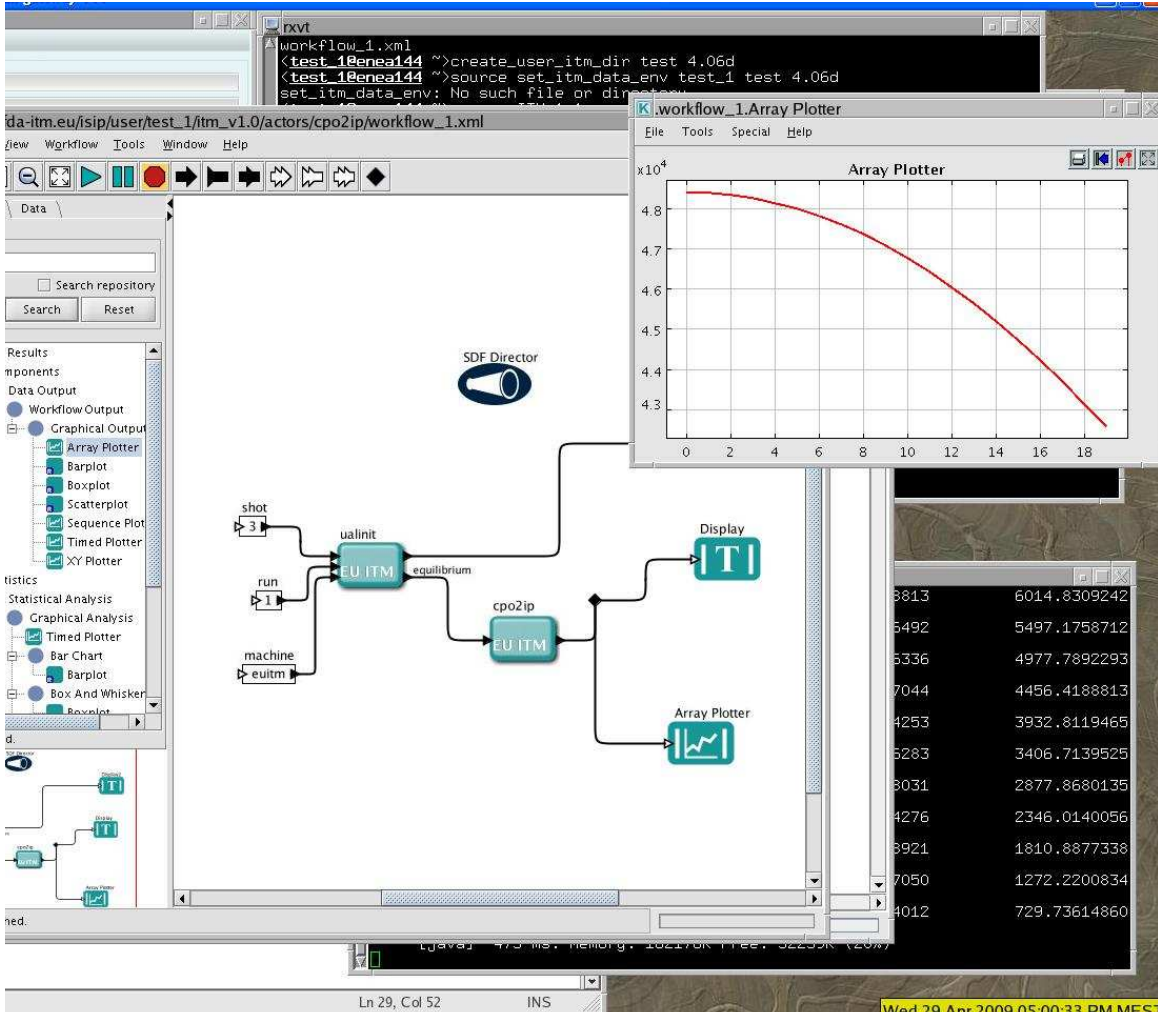
<https://portal.efda-itm.eu/portal/authsec/portal/itm/ISIP>  
[isip@mail.efda-itm.eu](mailto:isip@mail.efda-itm.eu)

## Build a library

- Check your environment variables: KEPLER, PTII & UAL
- Did you download your own copy of KEPLER?
- Create a directory: cpo2ip for instance
- Copy cpo2ip.f90 and make\_pgi or make\_g95 from:
  - [/afs/efda-itm.eu/isip/user/test\\_1/public/cpo2ip](/afs/efda-itm.eu/isip/user/test_1/public/cpo2ip)
- Build your library
- Launch « fc2k »
- Build an actor « cpo2ip » and save your parameters
- Look at the generated file: [\\$KEPLER/src/cpp/itm/cpo2ip/FortranCall.f90](#)

# Build your workflow

- Launch « kepler »
- Add UALinit, SDF director, Display, Array plotter and your new actor
- Once done, Animate your workflow, save it and run it



The screenshot displays the Kepler workflow editor interface. At the top, a terminal window shows the following commands and output:

```

workflow_1.xml
<test_1@eneas144 ~>create_user_itm_dir test 4.06d
<test_1@eneas144 ~>source set_itm_data_env test_1 test 4.06d
set_itm_data_env: No such file or directory
  
```

The main workspace shows a workflow diagram with the following components and connections:

- Inputs:** 'shot' (value 3), 'run' (value 1), and 'machine' (value 'euitm').
- Actors:** 'EU-ITM equilibrium', 'EU-ITM cpo2ip', 'Display', and 'Array Plotter'.
- Connections:** 'EU-ITM equilibrium' receives inputs from 'shot', 'run', and 'machine'. Its output goes to 'EU-ITM cpo2ip'. The output of 'EU-ITM cpo2ip' is split to feed into both 'Display' and 'Array Plotter'.

On the right, a plot window titled 'Array Plotter' shows a red curve on a grid. The y-axis is labeled 'x10<sup>4</sup>' and ranges from 4.3 to 4.8. The x-axis ranges from 0 to 18. The curve starts at approximately (0, 4.8) and decreases to approximately (18, 4.3).

At the bottom right, a terminal window displays a list of numerical data:

38813	6014.8309242
5492	5497.1758712
5336	4977.7892293
7044	4456.4188813
4253	3932.8119465
5283	3406.7139525
8031	2877.8680135
4276	2346.0140056
3921	1810.8877338
7050	1272.2200834
4012	729.73614860

The status bar at the bottom indicates 'Ln 29, Col 52 INS' and the date 'Wed 29 Apr 2009 05:00:33 PM MESJ'.

## Build your 2<sup>nd</sup> workflow

- Using your program (coreprof to mhd CPO) or :
- « use myprogram.f90 and make\_g95 » from:
  - [/afs/efda-itm.eu/isip/user/test\\_1/exos](/afs/efda-itm.eu/isip/user/test_1/exos)
- Build your actor with fc2k
- Launch « kepler »
- Add UALinit, UALcollector, SDF director and your new actor
- Run it

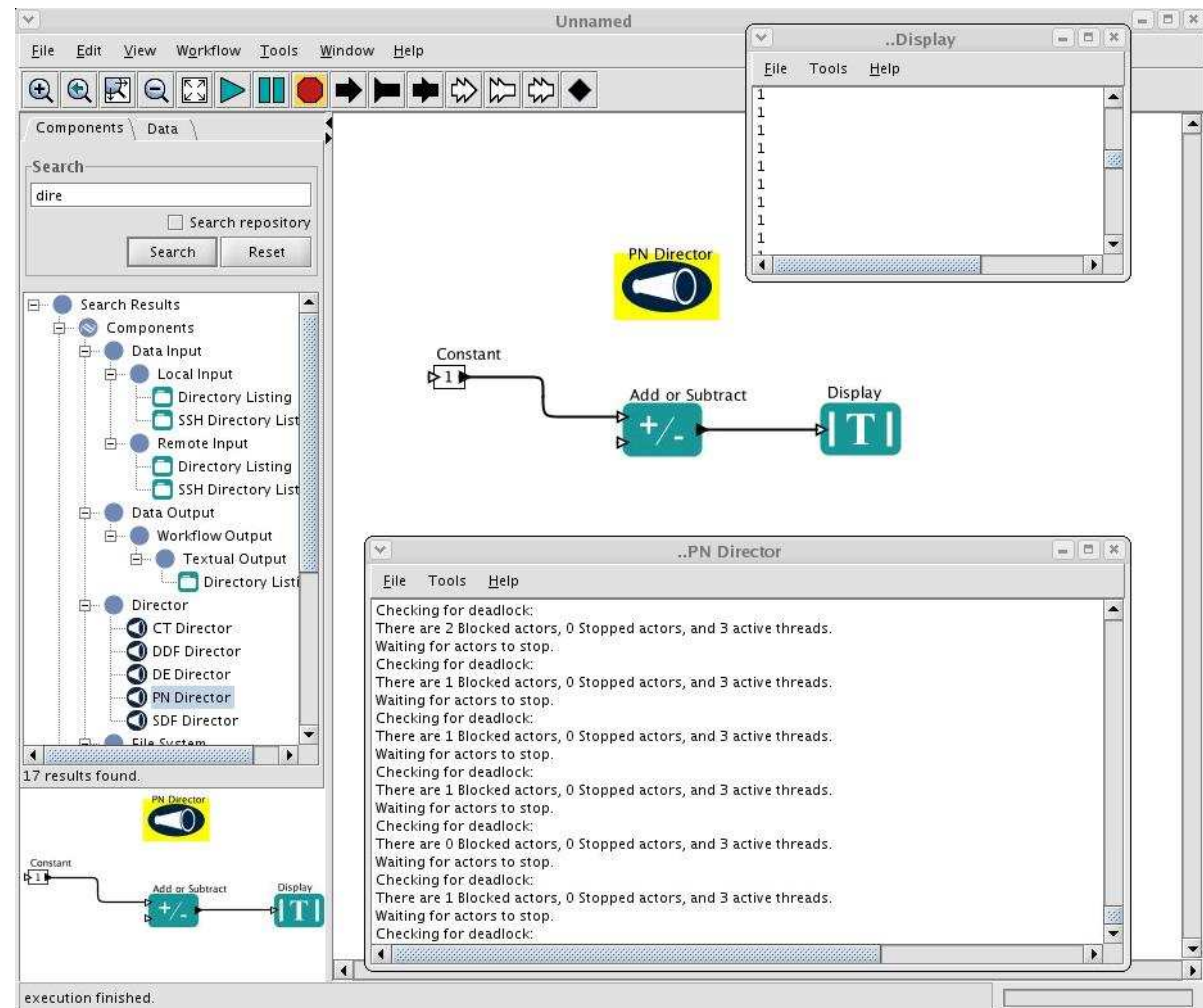
# Playing with directors

- Add « Add/subtract » actor and Constant and Display
- Using **SDF**
- Run it
- What is happening?
- How to fix it?

The screenshot displays a software interface with a menu bar (File, Edit, View, Workflow, Tools, Window, Help) and a toolbar. On the left, a 'Components' panel shows a search for 'direct' with 17 results found. The search results are organized into categories: Components, Data Input, Data Output, and Director. Under 'Director', several options are listed, including 'SDF Director'. The main workspace shows a workflow diagram with three actors: 'Constant' (outputting '1'), 'Add or Subtract' (with a '+/-' symbol), and 'Display' (with a 'T' symbol). A 'SDF Director' icon is also visible in the workspace. A small window titled '..Display' is open, showing the output '1' on two lines. At the bottom, a status bar indicates 'execution finished.'

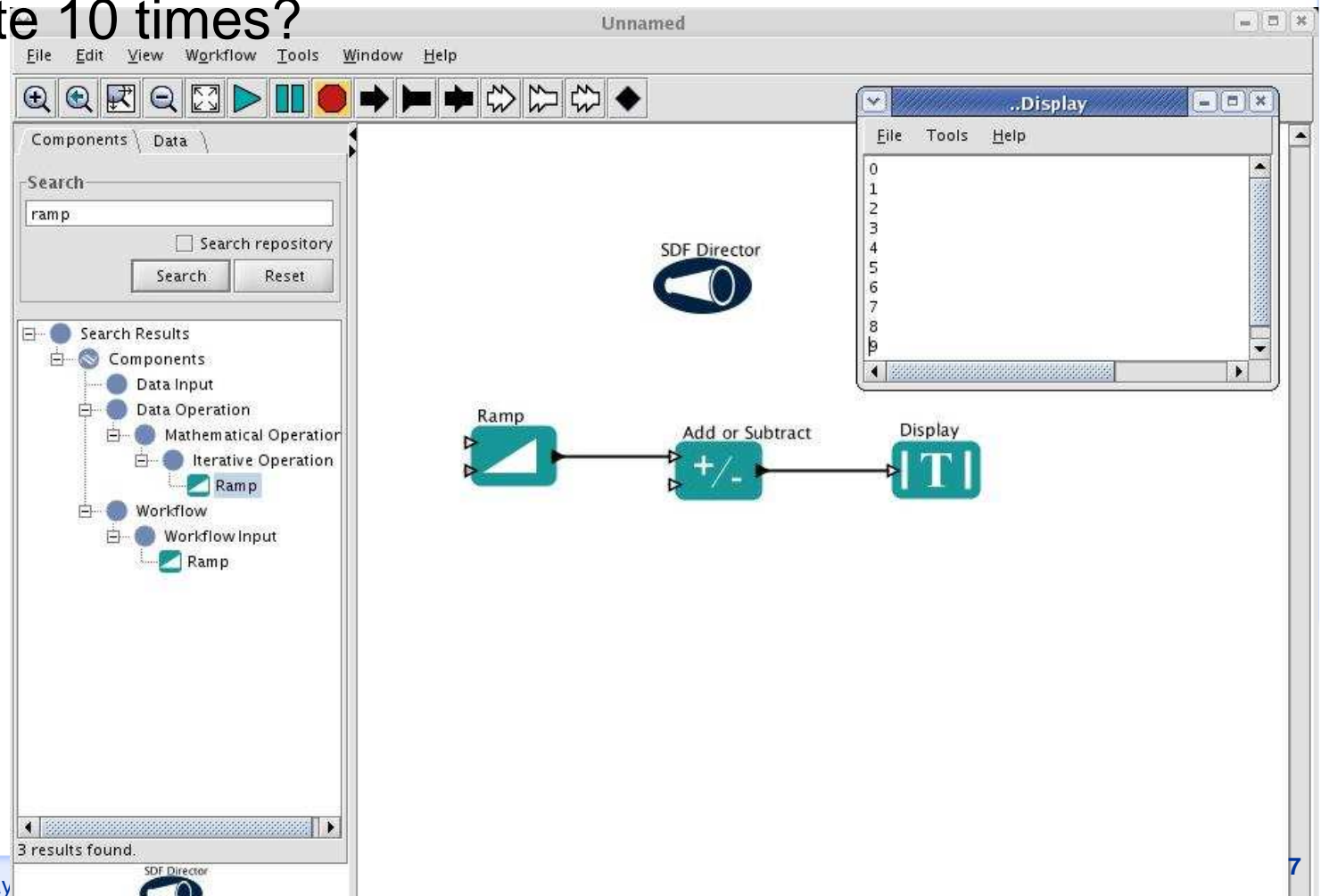
# Playing with directors

- Add « Add/subtract » actor and Constant and Display
- Using **PN**
- Run it
- What is happening?
- How to fix it?
- Trick: single fire



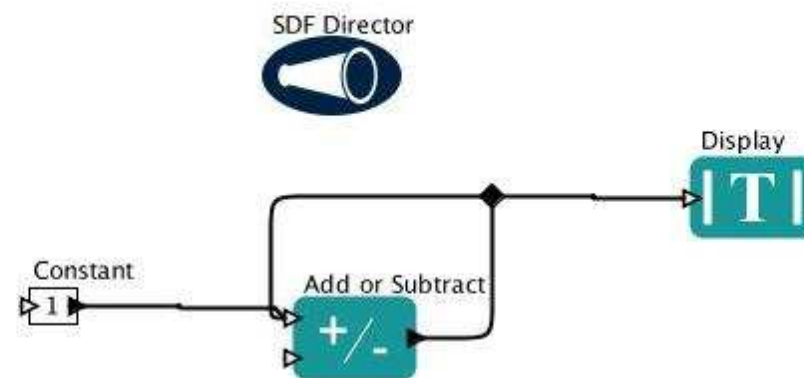
# Iteration

- Add « Add/subtract » actor and **Ramp** and Display
- Using SDF
- How to iterate 10 times?



# Iteration

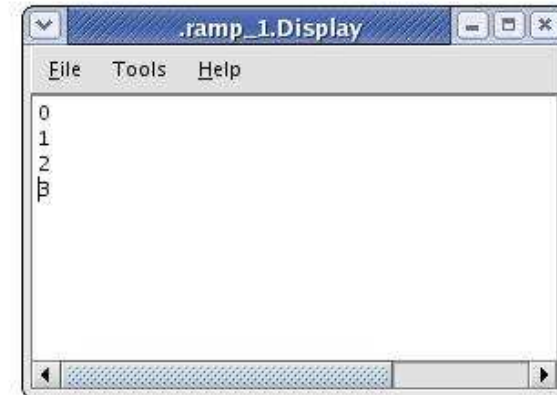
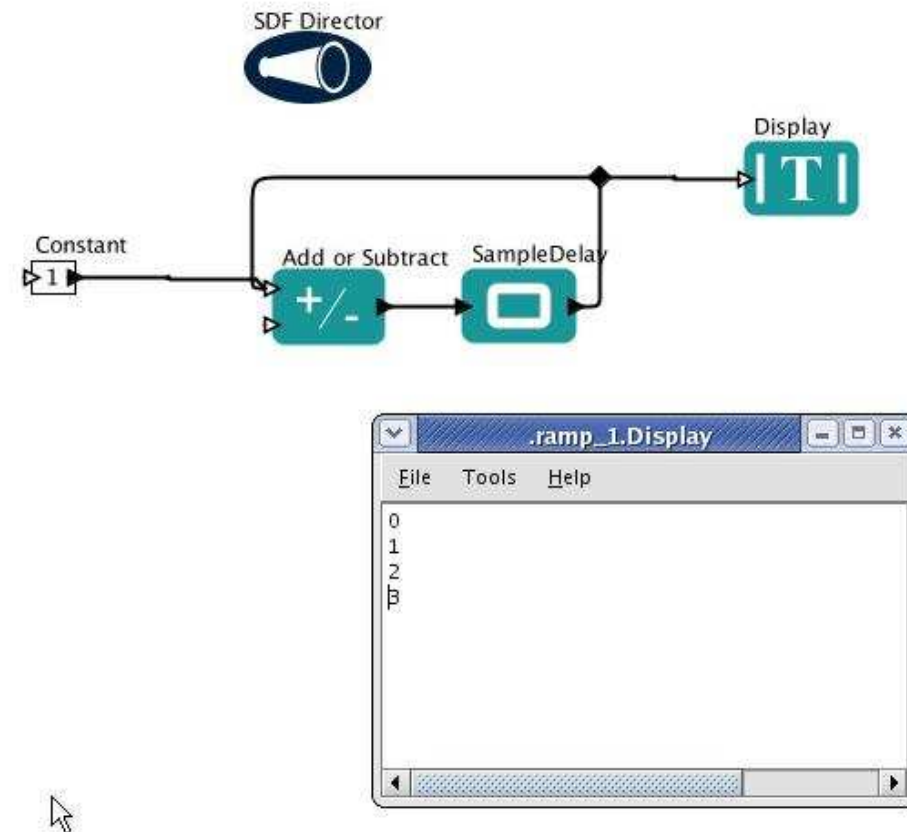
- Add « Add/subtract » actor and Constant and Display
- Using SDF
- How to iterate 10 times





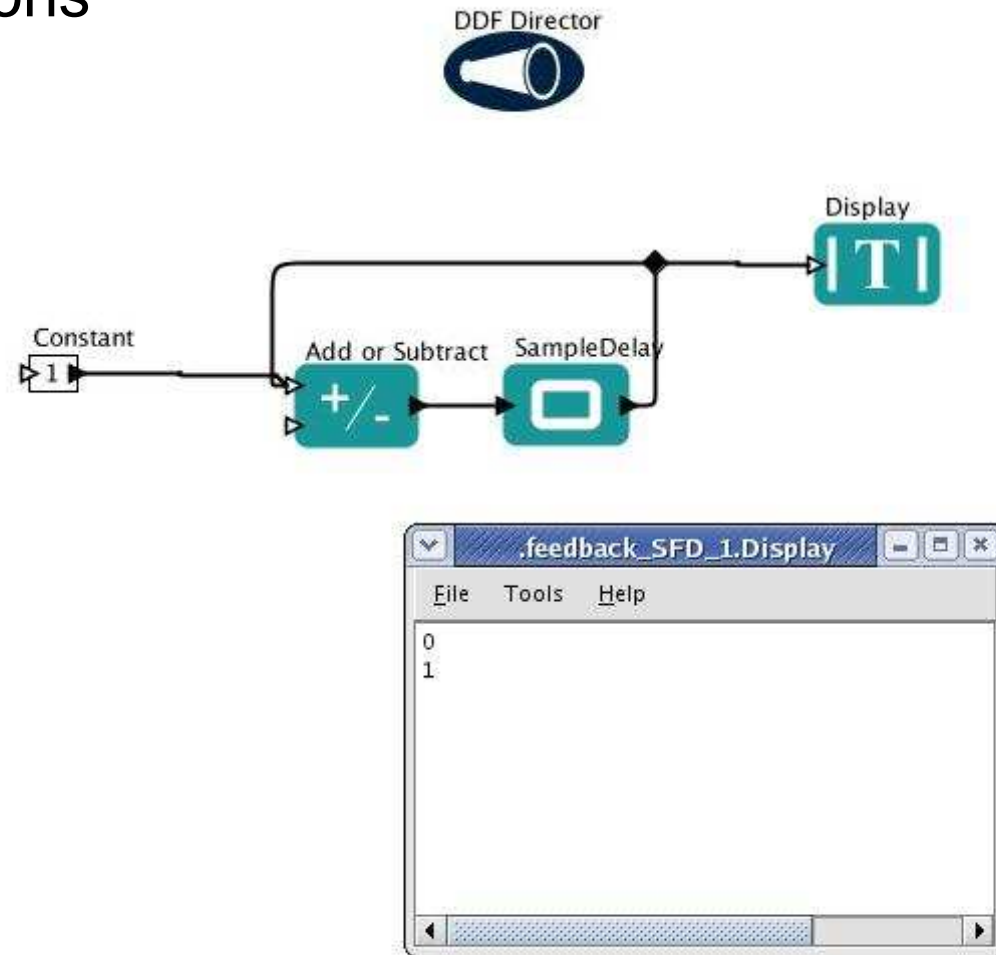
# Iteration

- Add « Add/subtract » actor and Constant and Display
- Using SDF
- How to iterate 10 times?



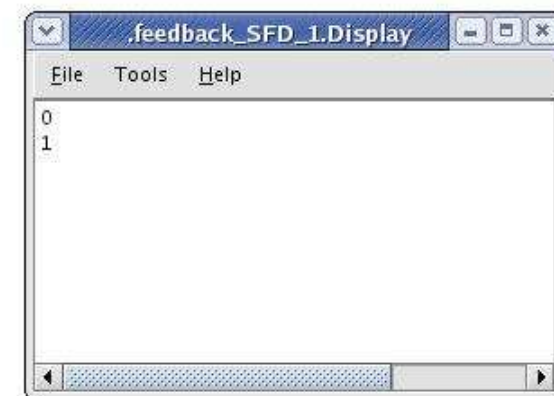
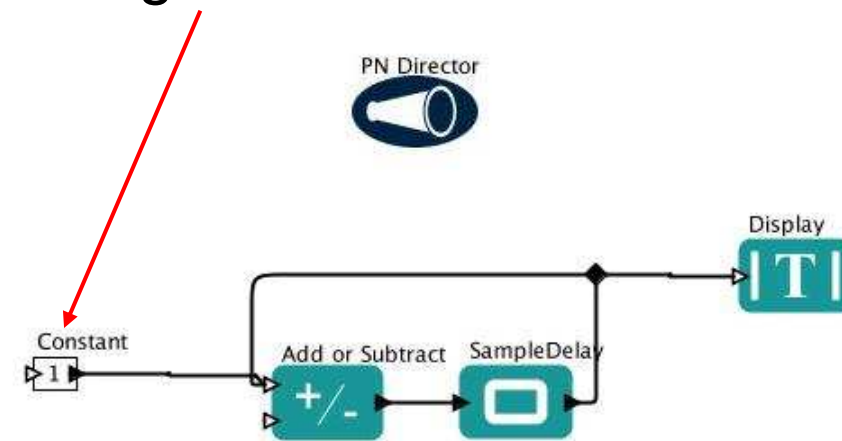
# Iteration

- Add « Add/subtract » actor and Constant and Display
- Using **DDF** with 4 iterations
- How many values?



# Iteration

- Add « Add/subtract » actor and Constant and Display
- Using **PN** with 2 iterations and single fire constant
- How many values?



# Feedback

- Integrate ( $n \cdot r(1 - n/k)$ ) and display the output (TimedPlotter)
- Using **CT** with a duration of 100s by time steps of 0.1s

## Tricks:

- Use the parameters for the actors
- Use expression for the computation (the input port is n)

