# BPL_TEST2_Fedbatch - demo

In [1]: 
```
run -i BPL_TEST2_Fedbatch_explore.py
```

```
Linux - run FMU pre-compiled OpenModelica

Model for the process has been setup. Key commands:
 - par()        - change of parameters and initial values
 - init()       - change initial values only
 - simu()       - simulate and plot
 - newplot()    - make a new plot
 - show()       - show plot from previous simulation
 - disp()       - display parameters and initial values from the last simul
ation
 - describe()   - describe culture, broth, parameters, variables with value
s/units

Note that both disp() and describe() takes values from the last simulation
and the command process_diagram() brings up the main configuration

Brief information about a command by help(), eg help(simu)
Key system information is listed with the command system_info()
```
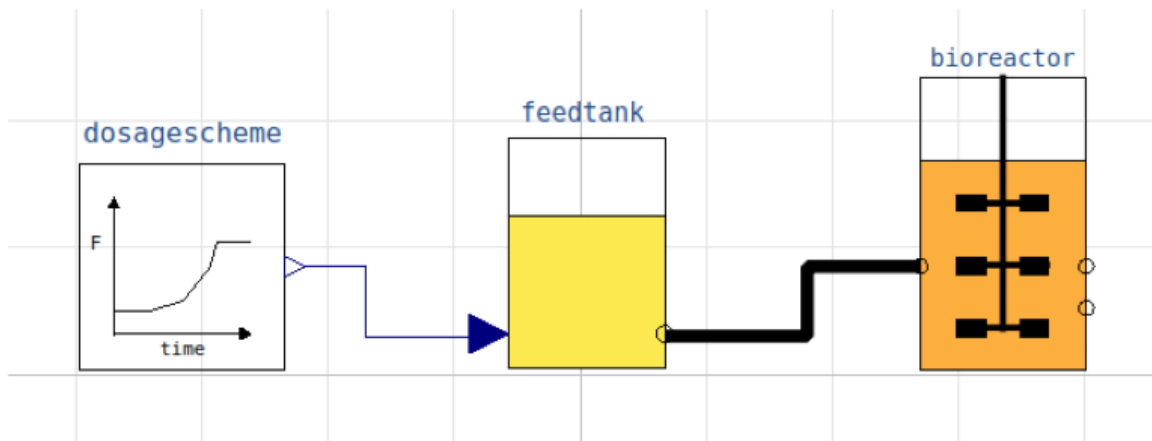
In [2]: 
```
%matplotlib inline
plt.rcParams['figure.figsize'] = [25/2.54, 20/2.54]
```

In [3]: 
```
process_diagram()
```

```
No processDiagram.png file in the FMU, but try the file on disk.
```
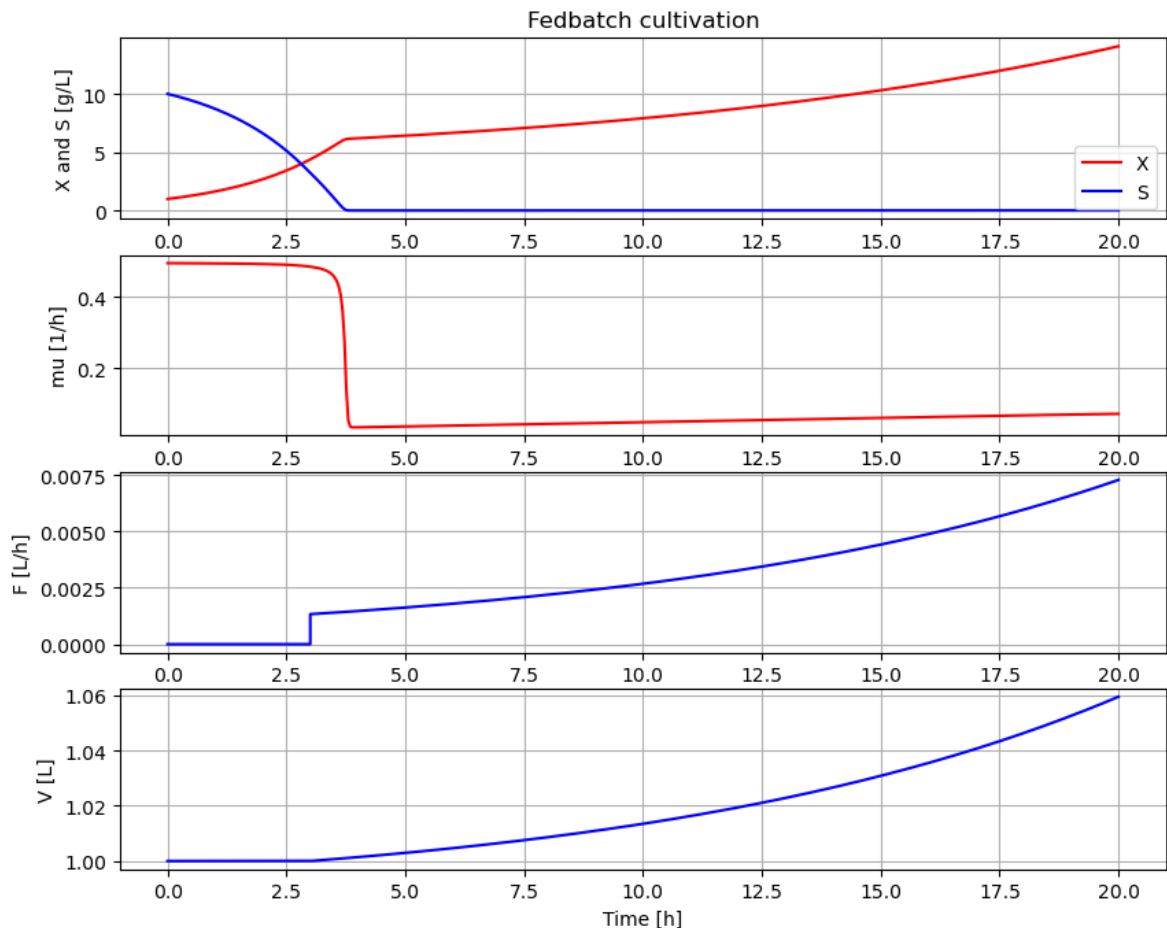


disp('dosagescheme')

In [4]: 
```
#disp('feedtank')
```

In [5]: 
```
#disp('bioreactor', mode='long')
```

In [6]: 
```
# Simulation with default values of the process
newplot(plotType='TimeSeries')
simu(20)
```

```
Could not find cannot import name 'dopri5' from 'assimulo.lib' (/home/janp
eter/miniconda3/envs/pyfmi/lib/python3.12/site-packages/assimulo/lib/__ini
t__.py)
Could not find cannot import name 'rodas' from 'assimulo.lib' (/home/janpe
ter/miniconda3/envs/pyfmi/lib/python3.12/site-packages/assimulo/lib/__init
__.py)
Could not find cannot import name 'odassl' from 'assimulo.lib' (/home/janp
eter/miniconda3/envs/pyfmi/lib/python3.12/site-packages/assimulo/lib/__ini
t__.py)
Could not find ODEPACK functions.
Could not find RADAR5
Could not find GLIMDA.
```
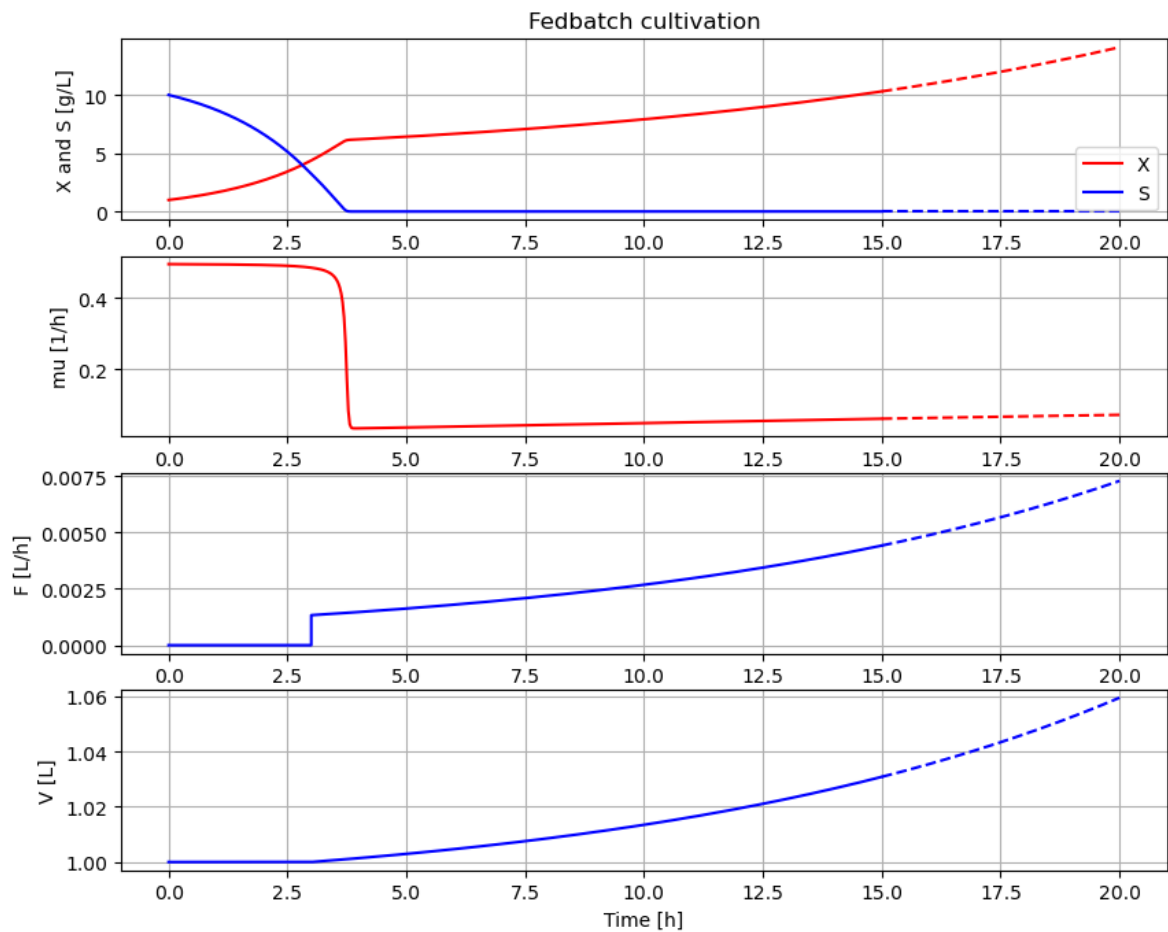


Fedbatch cultivation

In [7]: ```
disp(mode='long')
```

```
bioreactor.V_start : V_start : 1.0
bioreactor.m_start[1] : VX_start : 1.0
bioreactor.m_start[2] : VS_start : 10.0
bioreactor.culture.Y : Y : 0.5
bioreactor.culture.qSmax : qSmax : 1.0
bioreactor.culture.Ks : Ks : 0.1
feedtank.c_in[2] : feedtank.S_in : 300.0
feedtank.V_start : feedtank.V_start : 10.0
dosagescheme.F_start : F_start : 0.0
dosagescheme.mu_feed : mu_feed : 0.1
dosagescheme.t_startExp : t_startExp : 3.0
dosagescheme.F_startExp : F_startExp : 0.001
dosagescheme.F_max : F_max : 0.3
```

In [8]: ```
# Test function simu(mode='cont')
newplot()
simu(15)
```

```
simu(5,'cont')
```



Fedbatch cultivation

In [9]: 
```
disp('culture')
```

```
Y : 0.5
qSmax : 1.0
Ks : 0.1
```

In [10]: 
```
describe('mu')
```

Cell specific growth rate variable : 0.073 [ 1/h ]

In [11]: 
```
describe('parts')
```

['bioreactor', 'bioreactor.culture', 'dosagescheme', 'feedtank']

In [12]: 
```
describe('MSL')
```

MSL: 4.1.0 - used components: RealInput, RealOutput

In [13]: 
```
system_info()
```

```
System information
 -OS: Linux
 -Python: 3.12.9
 -Scipy: not installed in the notebook
 -PyFMI: 2.18.0
 -FMU by: OpenModelica Compiler OpenModelica 1.26.0~dev-200-gcb3254b
 -FMI: 2.0
 -Type: FMUModelME2
 -Name: BPL.Examples_TEST2.Fedbatch
 -Generated: 2025-07-28T07:58:59Z
 -MSL: 4.1.0
 -Description: Bioprocess Library version 2.3.1
 -Interaction: FMU-explore version 1.0.0
```

In [14]: `!lsb_release -a`

```
No LSB modules are available.
Distributor ID: Ubuntu
Description:    Ubuntu 24.04.3 LTS
Release:        24.04
Codename:       noble
```

In [ ]: