

# BPL\_TEST2\_Chemostat - demo

In [1]: `run -i BPL_TEST2_Chemostat_explore.py`

Windows - run FMU pre-compiled JModelica 2.14

Model for bioreactor 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 simulation
- `describe()` - describe culture, broth, parameters, variables with values/units

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

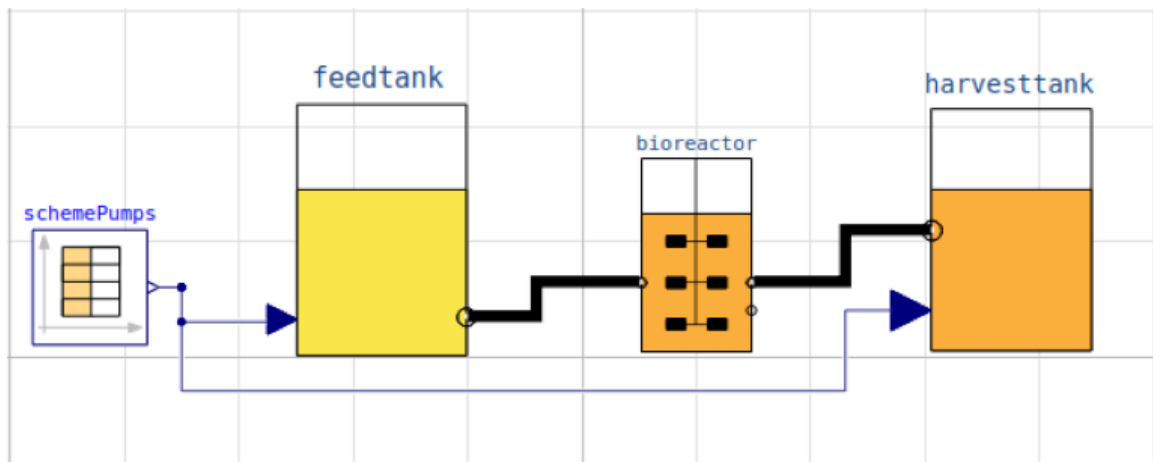
Brief information about a command by `help()`, eg `help(simu)`

Key system information is listed with the command `system_info()`

In [2]: `%matplotlib inline`  
`plt.rcParams['figure.figsize'] = [25/2.54, 20/2.54]`

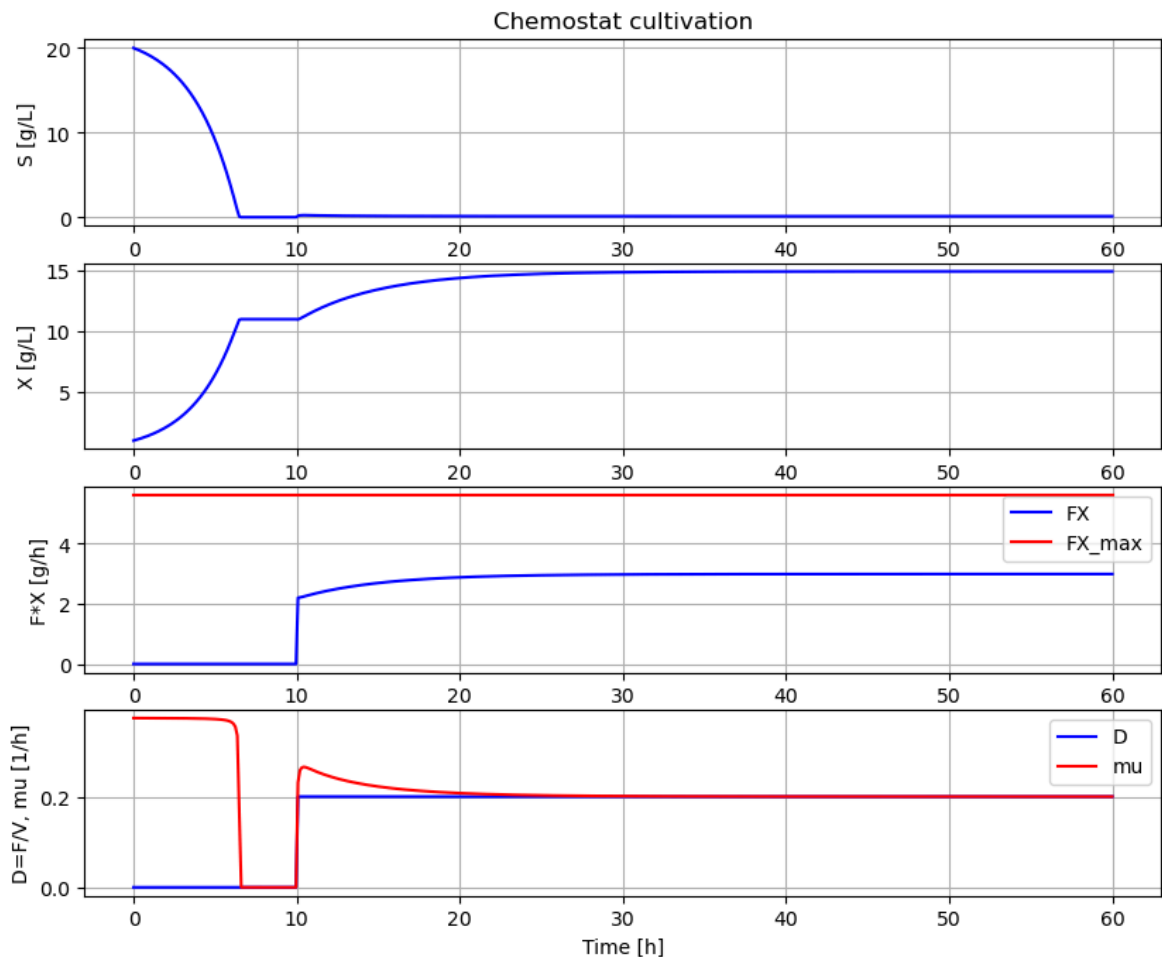
In [3]: `process_diagram()`

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



In [4]: `#fmu_model = 'xBPL_TEST2_Chemostat_linux_om_me.fmu'`  
`#model = Load_fmu(fmu_model, log_level=0)`

In [5]: `newplot()`  
`par(Y=0.50, qSmax=0.75, Ks=0.1)` *# Culture parameters*  
`init(V_start=1.0, VX_start=1.0, VS_start=20)` *# Bioreactor startup*  
`par(S_in=30, t0=0, F0=0, t1=10, F1=0.2)` *# Substrate feeding*  
`simu(60)`



```
In [6]: # The maximal biomass productivity FX_max [g/h] marked red in the diagram above
# can be calculated for CSTR from the FMU and is
cstrProdMax(model)
```

```
Out[6]: 5.625
```

```
In [7]: describe('cstrProdMax')
```

Calculate from the model maximal chemostat productivity  $FX_{max}$  : 5.625 [ g/h ]

```
In [8]: disp('culture')
```

```
Y : 0.5
qSmax : 0.75
Ks : 0.1
```

```
In [9]: describe('mu')
```

Cell specific growth rate variable : 0.2 [ 1/h ]

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

```
['bioreactor', 'bioreactor.culture', 'D', 'feedtank', 'harvesttank', 'MSL', 'schemePumps']
```

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

MSL: RealInput, RealOutput, CombiTimeTable, Types

```
In [12]: system_info()
```

## System information

- OS: Windows
- Python: 3.10.14
- Scipy: not installed in the notebook
- PyFMI: 2.16.1
- FMU by: JModelica.org
- FMI: 2.0
- Type: FMUModelCS2
- Name: BPL.Examples\_TEST2.Chemostat
- Generated: 2024-11-06T16:32:56
- MSL: 3.2.2 build 3
- Description: Bioprocess Library version 2.3.0
- Interaction: FMU-explore version 1.0.0

In [ ]: