USE OF Simcenter Amesim FOR FILLING OPTIMIZATION

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Filling machine example

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Variety of products

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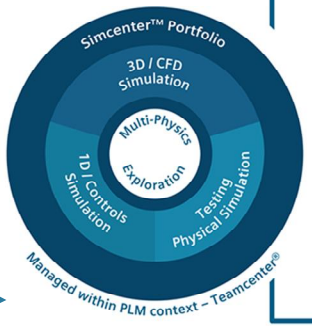
Change in methodology



Simcenter™

OpenFOAM

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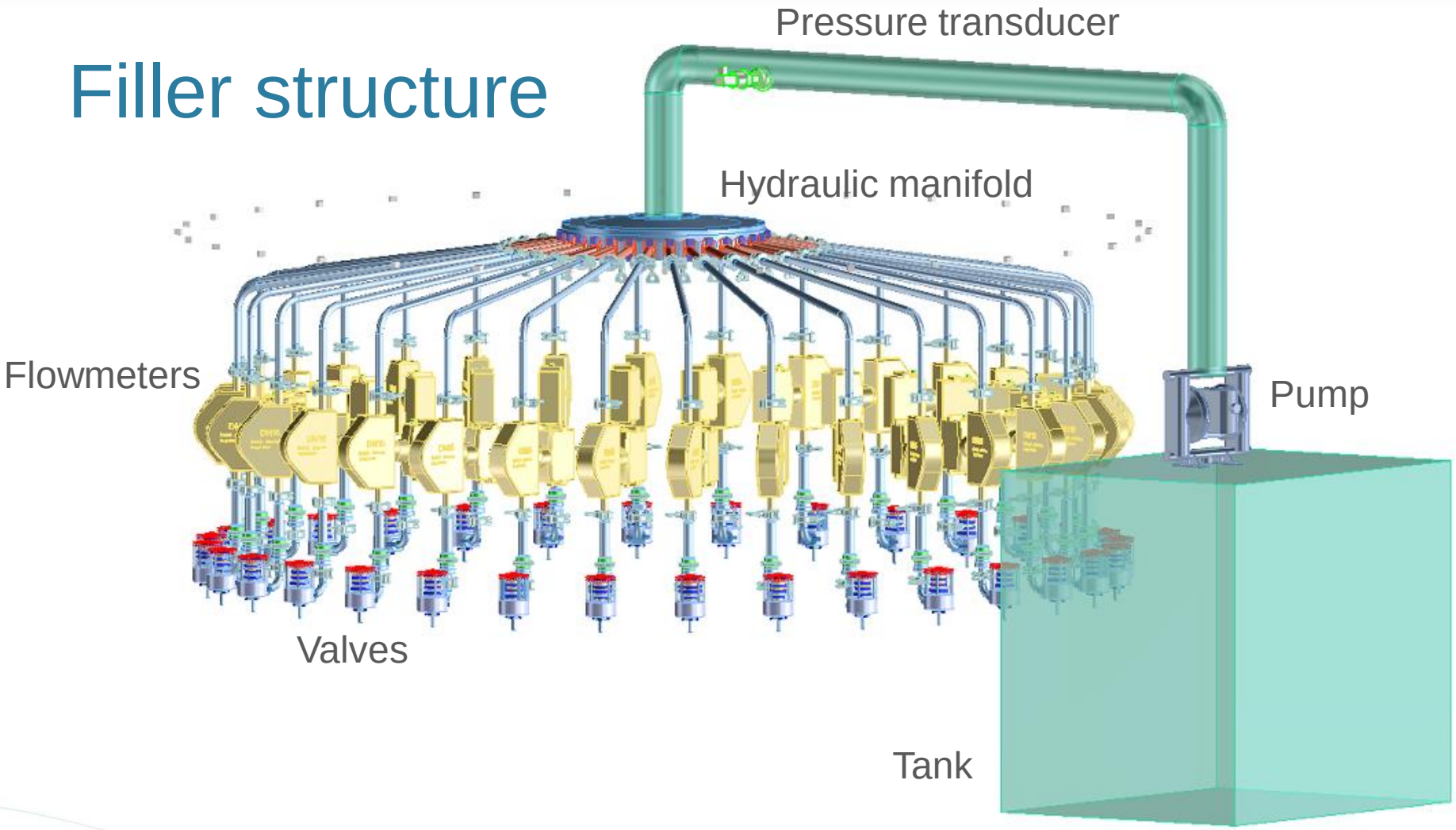
Filler structure



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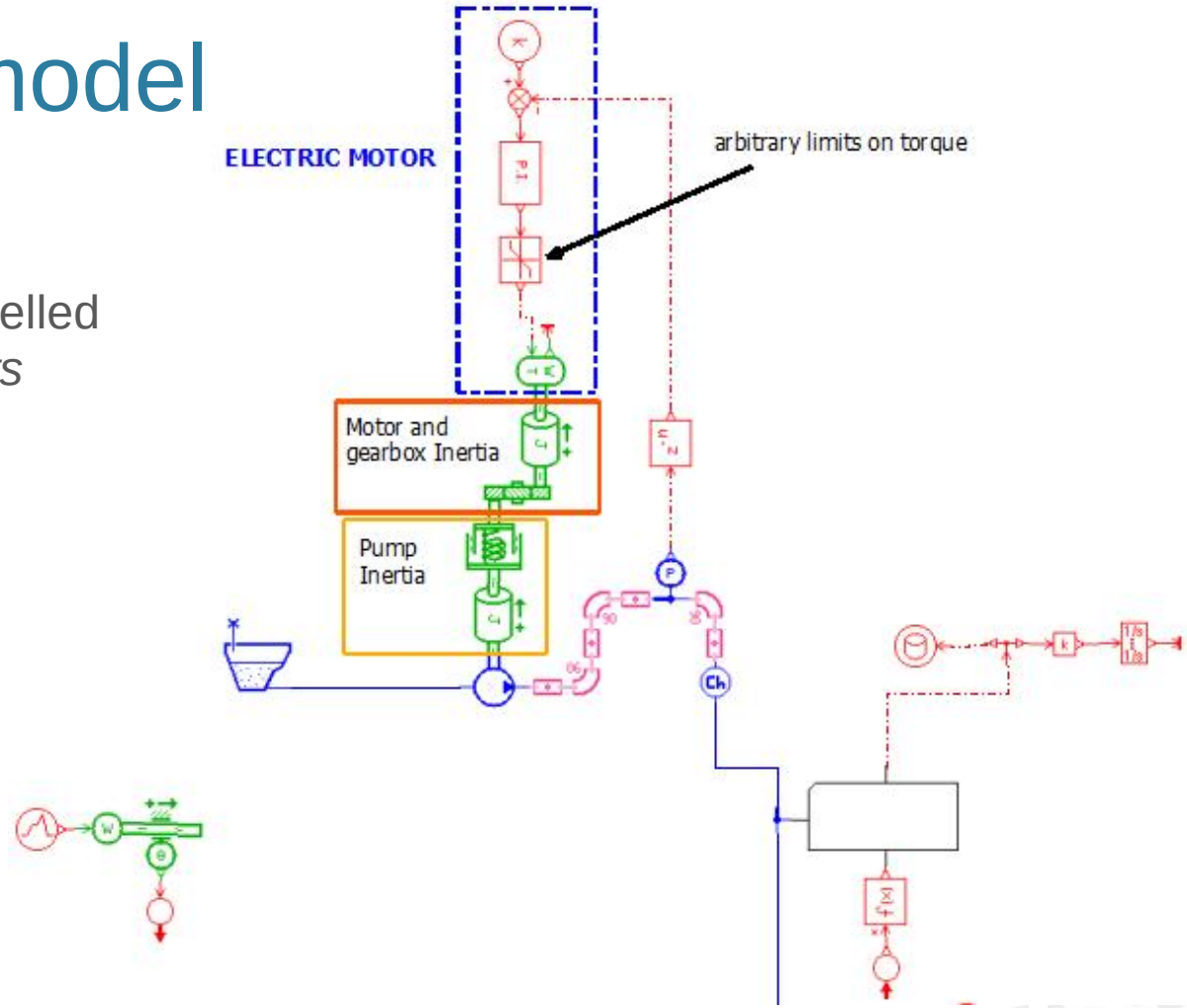
Amesim model

The valves are modelled as *supercomponents*



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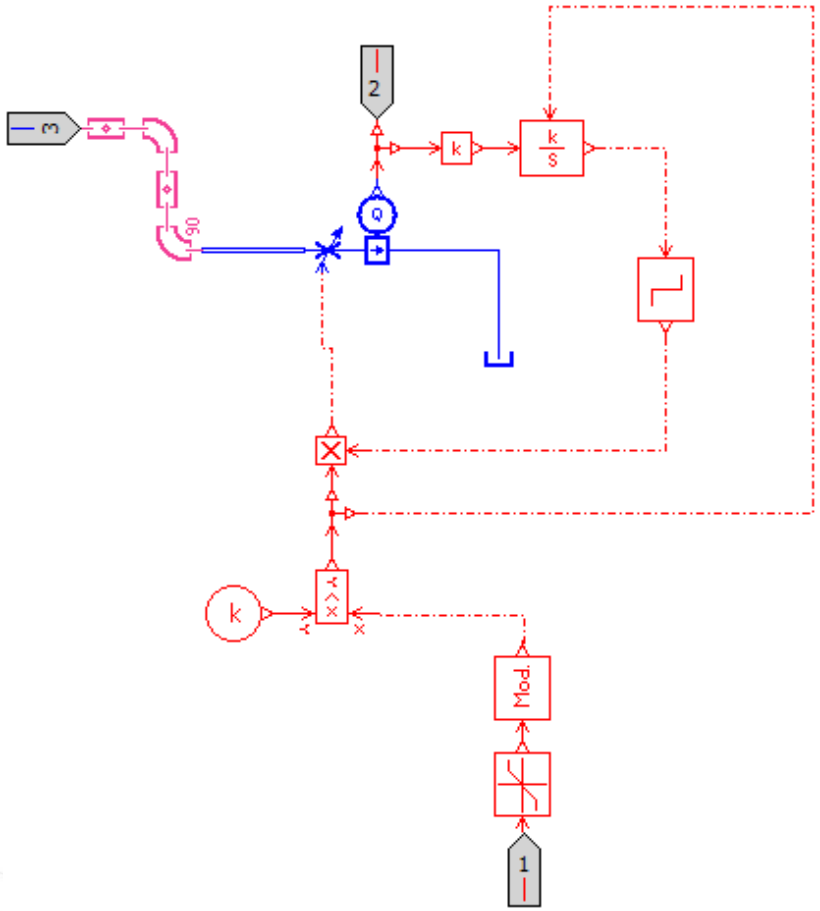
Valve supercomponent detail



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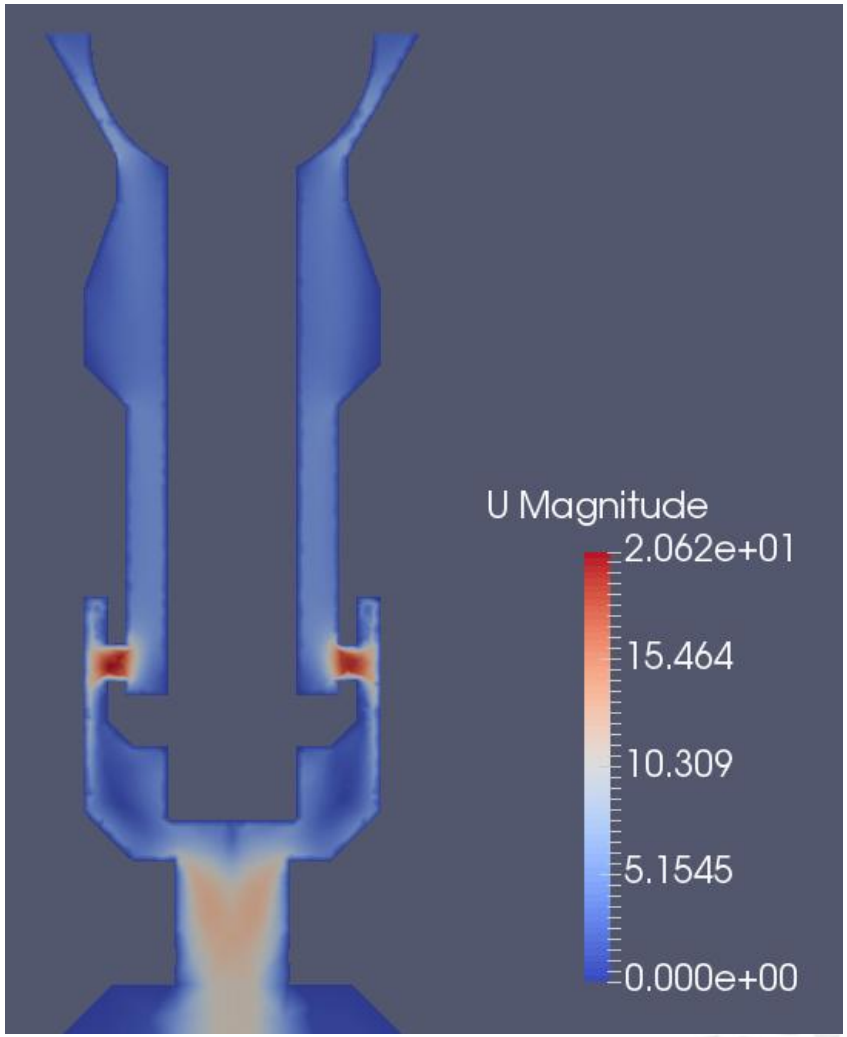
Use of 3D CFD

- The geometry of the valve can't be modelled as 1D
- From a 3D analysis it's possible to extract the characterization curve of the geometry
- This curve, inserted in the 1D model is used as an input for the rest of the model



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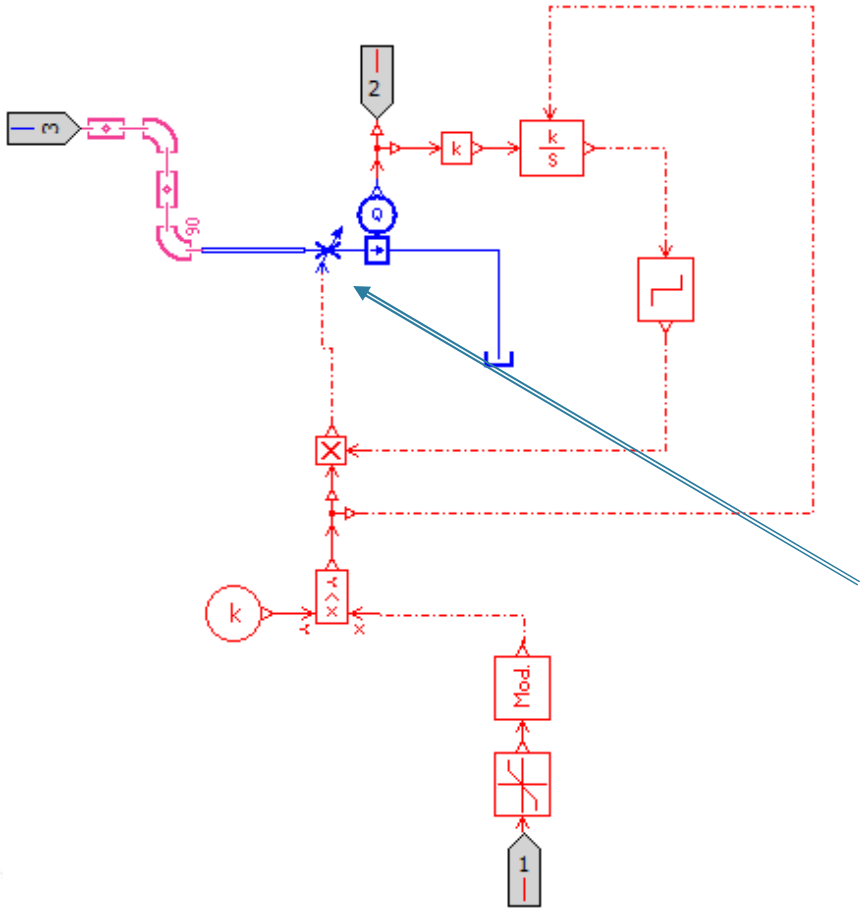
Valve supercomponent detail

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     0.00000000000000e+000    -4.50000000000000e+000
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     0.00000000000000e+000     3.21000000000000e+000
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     0.00000000000000e+000     5.62500000000000e+000
```

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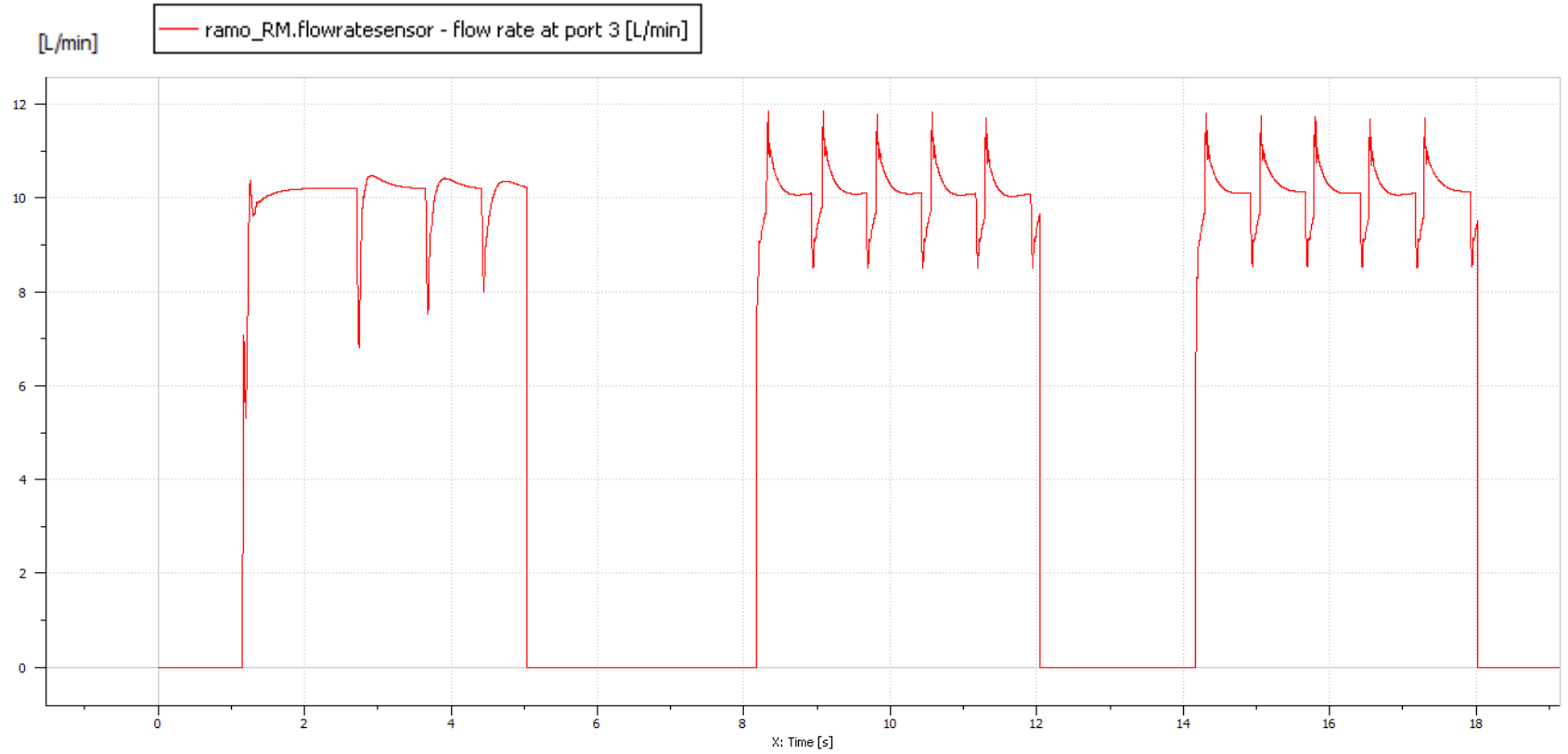
Flowrate through a valve



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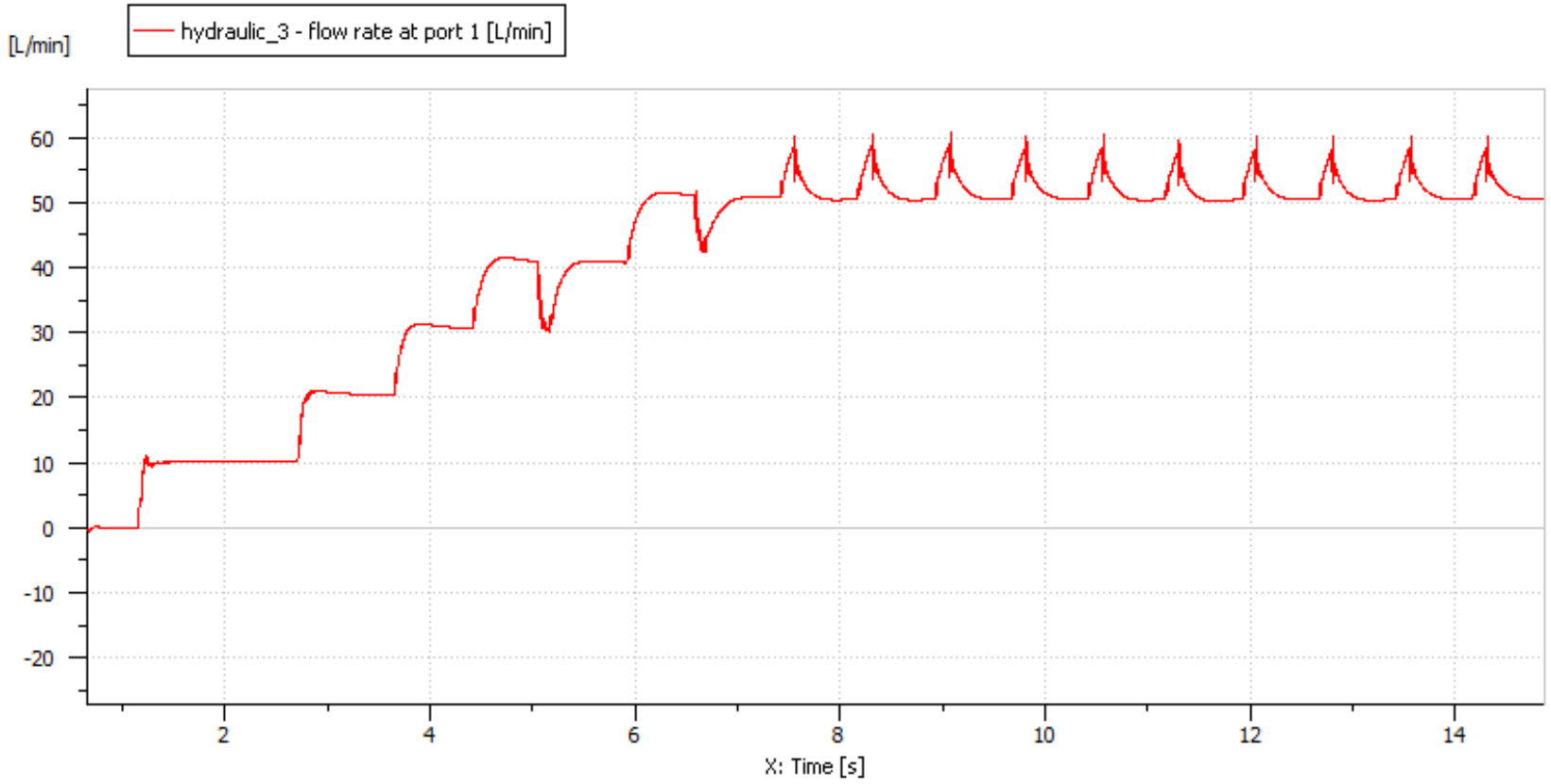
Flowrate through the filling machine



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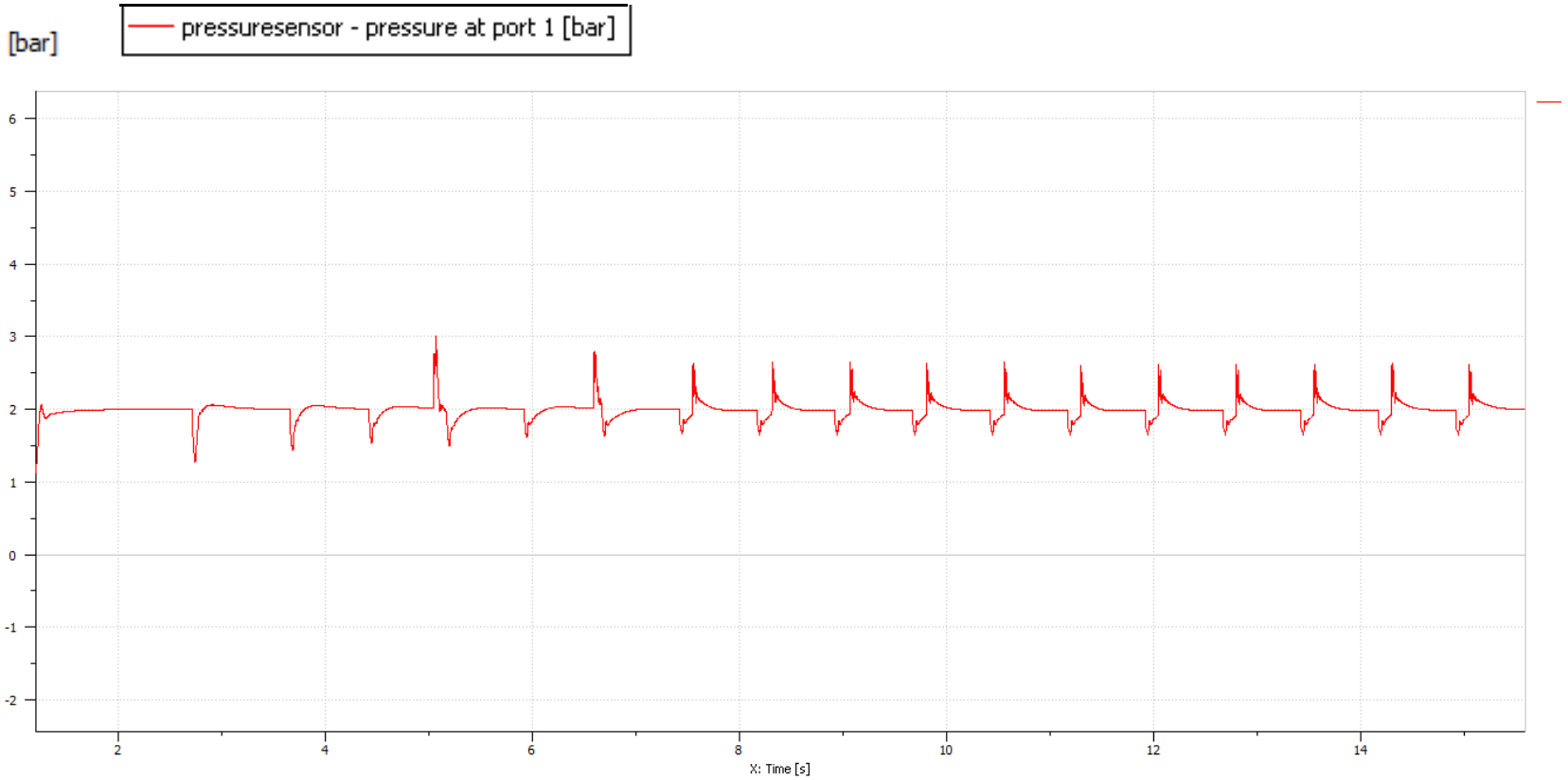
Pressure at inlet of the filling machine



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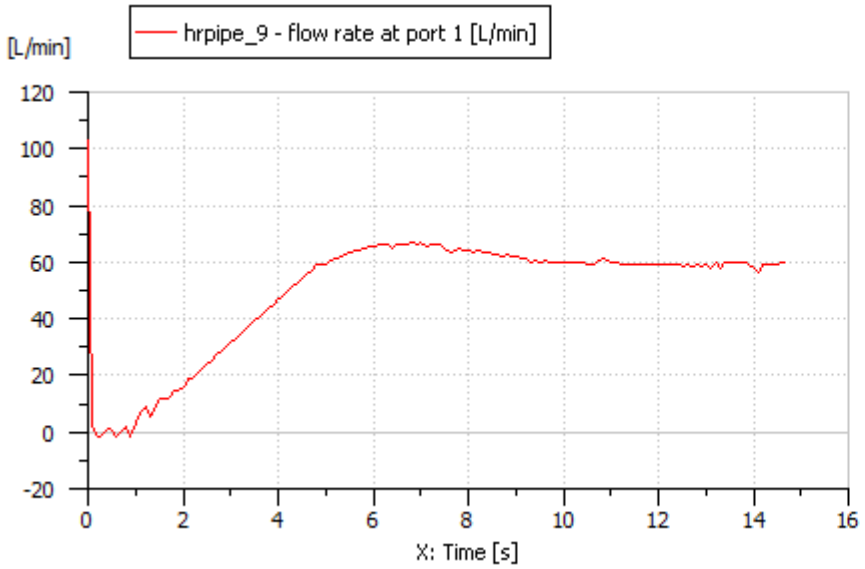
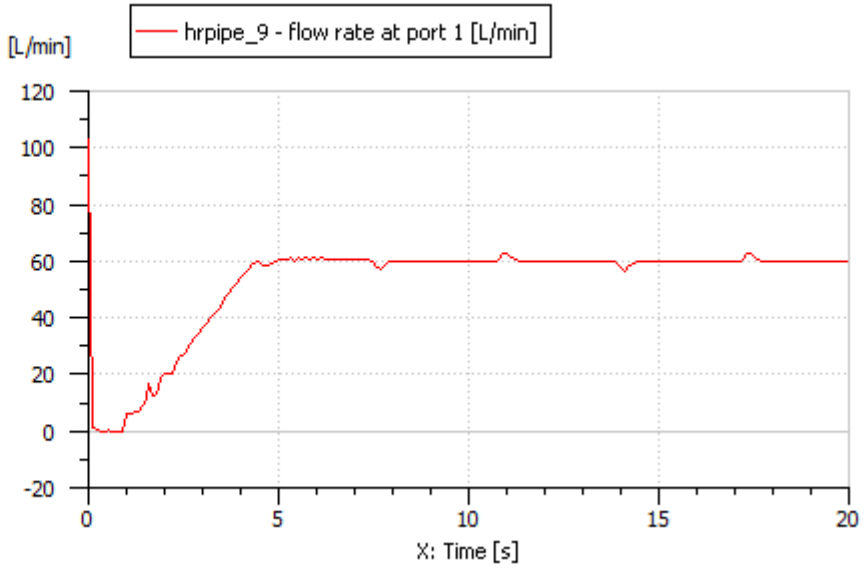
Comparison of different PI parameters





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What is this useful for?

- We can test different parameters of the controllers to evaluate the effects on the stability of the pressure and in general of the flow
- We can verify if the pressure oscillations are in an acceptable range
- We can test different geometries without any need to create them in real life
- We can easily adapt the same model for different machines and conditions.
- We can even test non-stationary situations due to either start and stop conditions or to disturbances of any kind

From trial-and-error to simulation guided choices

- Increased accuracy in setting up the control parameters
- Enhanced pressure stability throughout the system
- Reduced number of produced components
- Testing time reduction
- Reduced necessity for Ronchi personnel intervention
- A better job at a lower cost

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