PistonAckumulator

In[72]:=
```
<< C:\\Hopsan\Compgen\CompgenNG.mx
```

In[73]:=
```
path = ToFileName[{"C:", "HopsanTrunk",
     "ComponentLibraries", "defaultLibrary", "Hydraulic", "Volumes&Lines"}];
```

In[74]:=
```
domain = "Hydraulic";
displayName = "PistonAckumulator";
brief = "This is piston with an inertia load";
componentType = "ComponentQ";
author = "Petter Krus <petter.krus@liu.se>";
affiliation =
  "Division of Fluid and Mechatronic Systems, Linköping University";
SetFilenames[path, domain, displayName];
ResetComponentVariables[];
Date[]
```

Out[82]=
```
{2016, 3, 5, 15, 35, 7.3376442}
```

Component description

Piston ackumulator with adiabatic thermodynamics.

Component equations

The name of the component is stored in ComponentName.

Variables and parameters

In[84]:=
```
inputParameters = {
    {Ap, 0.001, double, "m2", "Piston area 1"},
    {SL, 0.5, double, "m", "Stroke"},
    {Bp, 10., double, "N/m/s", "Visc. friction coeff."},
    {ML, 1., double, "kg", "Inertia"},
    {kappa, 1.2, double, "", "polytropic exp. of gas"},
    {p0, 1. * 10^7, double, "N/m^2", "Preload pressure"}
   };
```

In[85]:=
```
outputVariables = {
    {Va, 1. * 10^-3, double, "m^3", "Gas volume"},
    {pa, 1. * 10^7, double, "Pa", "Ackumulator oil pressure"},
    {xmp, 0., double, "m", "Piston position (Set startvalue here!)"},
    {vmp, 0., double, "m/s", "Piston speed"}
   };
```

In[86]:=
```
nodeConnections = {
      HydraulicQnode[1, 1. * 10^5, "hydraulic node 1"]};
```

The system of equations

The generated piston force

In[87]:=
```
fg = Ap p1 - Ap pa;
```

In[88]:=
```
systemEquationsDA := {
    ML der[der[xmp]] + Bp der[xmp] == fg ,
    ML der[vmp] + Bp vmp  == fg ,
    q1 == - Ap vmp ,
    pa (limit[SL - xmp, 0.001 SL, SL] Ap)^kappa  == p0 (SL Ap) ^kappa
    }
```

Limitatons

In[89]:=
```
expressions = {Va == (SL - xmp) Ap};
```

In[90]:=
```
variable2Limits = {{xmp, vmp, 0., SL}};
```

In[91]:=
```
variableLowLimits = {{p1, 0.}};
```

The boundarys

In[92]:=
```
systemBoundaryEquations = {
    p1 == c1 + Zc1e q1
  };
```

The vector of independent variables of the system are

In[93]:=
```
systemVariables = {xmp, vmp, q1, pa, p1};
```

In[94]:=
```
Compgen[file]
```