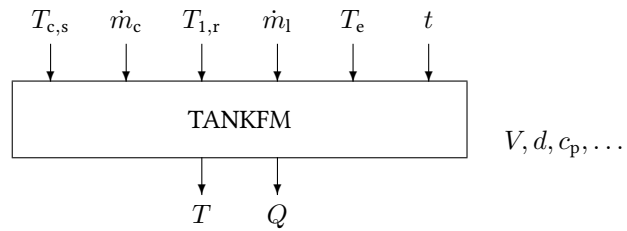


Block TANKFM

The TANKFM block simulates a fully-mixed storage tank.



Name	TANKFM
Function	st0028
Inputs	6
Outputs	2
Parameters	6
Strings	0
Group	S

Inputs

- 1 Supply temperature from collector $T_{c,s} / ^\circ\text{C}$
- 2 Collector mass flow rate $\dot{m}_c / \text{kg s}^{-1}$
- 3 Return temperature from load $T_{l,r} / ^\circ\text{C}$
- 4 Load mass flow rate $\dot{m}_l / \text{kg s}^{-1}$
- 5 Environment temperature $T_e / ^\circ\text{C}$
- 6 Time / s

Outputs

- 1 Storage temperature $T / ^\circ\text{C}$
- 2 Energy content of the storage Q / J

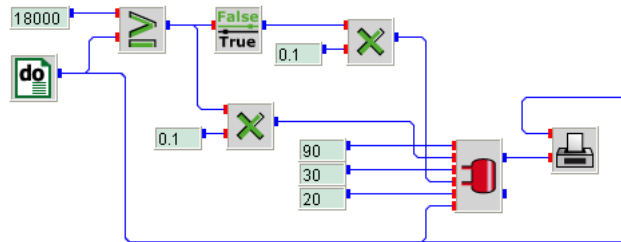
Parameters

- 1 Tank volume V / m^3
- 2 Tank diameter d / m
- 3 Specific heat of fluid $c_p / \text{J kg}^{-1} \text{K}^{-1}$
- 4 Fluid density $\rho / \text{kg m}^{-3}$
- 5 Overall heat-loss coefficient $U / \text{W m}^{-2} \text{K}^{-1}$
- 6 Initial tank temperature $T_0 / ^\circ\text{C}$

Strings

None

tankfm.vseit

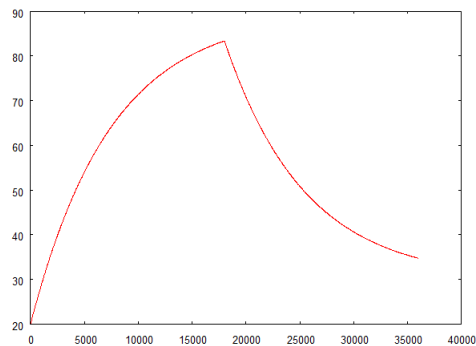


A fully mixed storage tank with a volume of 0.75 m^3 and a diameter of 0.7 m is simulated over a time period of $36\,000$ seconds (10 hours) in steps of 20 seconds, as defined by a [DO](#) block. The tank fluid is assumed to be water with a specific heat capacity of $4190 \text{ J kg}^{-1} \text{ K}^{-1}$ and a density of 1000 kg/m^3 . The overall heat-loss coefficient is set to $0.5 \text{ W m}^{-2} \text{ K}^{-1}$ at an initial tank temperature of $20 \text{ }^\circ\text{C}$.

The supply temperature of the tank is set constant to $90 \text{ }^\circ\text{C}$, the return temperature is assumed to be $30 \text{ }^\circ\text{C}$, and the environment temperature of the tank is set to $20 \text{ }^\circ\text{C}$, as defined by three [CONST](#) blocks.

The logics implies that the tank is charged for $18\,000$ seconds (5 hours) at a mass flow of 0.1 kg/s and then discharged with the same mass flow. As long as the value $18\,000$, defined by a [CONST](#) block is greater or equal to the output of the [DO](#) block, the [GE](#) block outputs one. This signal, multiplied by the constant mass flow rate of 0.1 kg/s by a [MUL](#) block gives the mass flow rate at $90 \text{ }^\circ\text{C}$ into the tank. The inverse signal of the hot water supply mass flow, generated by the [INV](#) block, is used as load mass flow of the tank.

The [PLOT](#) block shows the resulting temperature profile in the tank.



See also [Block TANKST](#).