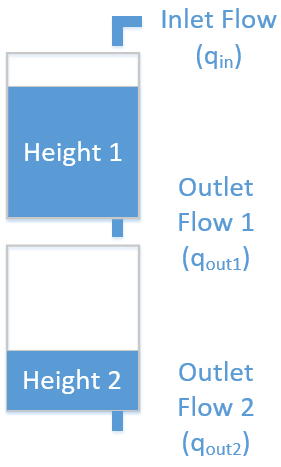
Cylindrical dual gravity drained tanks with a constant cross sectional area (*Ac*=2 *m2*) and maximum height of 1 *m*. If the tank overfills, the excess fluid is lost. There is an inlet flow *qin*, an intermediate outlet flow from tank 1 to tank 2 as *qout1*, and a final outlet flow as *qout2*. All flows are in units of *m3/hr* and heights are reported in units of *m*.

A mass balance on each tank is used to derive the following equations that relate inlet flow to the height of the tanks.

The outlet flow rate for each tank depends on the height in the tank according to Bernoulli’s equation for incompressible fluids as:

The tanks are initially empty when the inlet to tank 1 starts to flow at a rate of 0.5 m3/hr.

1. **Solve** for the heights (*h1* and *h2*) as functions of time with *c1*=0.13 and *c2*=0.20. Use a timestep size of **dt=0.5 *hr*** and solve to **t=10 hr**.
2. **Plot** the predicted heights *h1* and *h2* and the measured height *h2* as functions of time on the same plot. Label the axes as "time (hr)" and “height (m)”.

Hint: use an explicit Euler's equation applied to each *dh/dt* above: *dh/dt = f(h,t) -> hn+1 = hn + dt\*f(hn,tn)*. Don’t forget to add an IF statement to check for overfill conditions such as =IF(predicted height>1.0,1.0,predicted height).