



System Integration

Conservation of Mass

$$\frac{dM_{cv}}{dt} = \sum_{in} \dot{m} - \sum_{out} \dot{m}$$

First Law of Thermodynamics

$$\frac{dE_{cv}}{dt} = \dot{Q}_{into\ cv} - \dot{W}_{by\ cv, other\ than\ press} + \sum_{in} \dot{m}(h + ke + pe) - \sum_{out} \dot{m}(h + ke + pe)$$