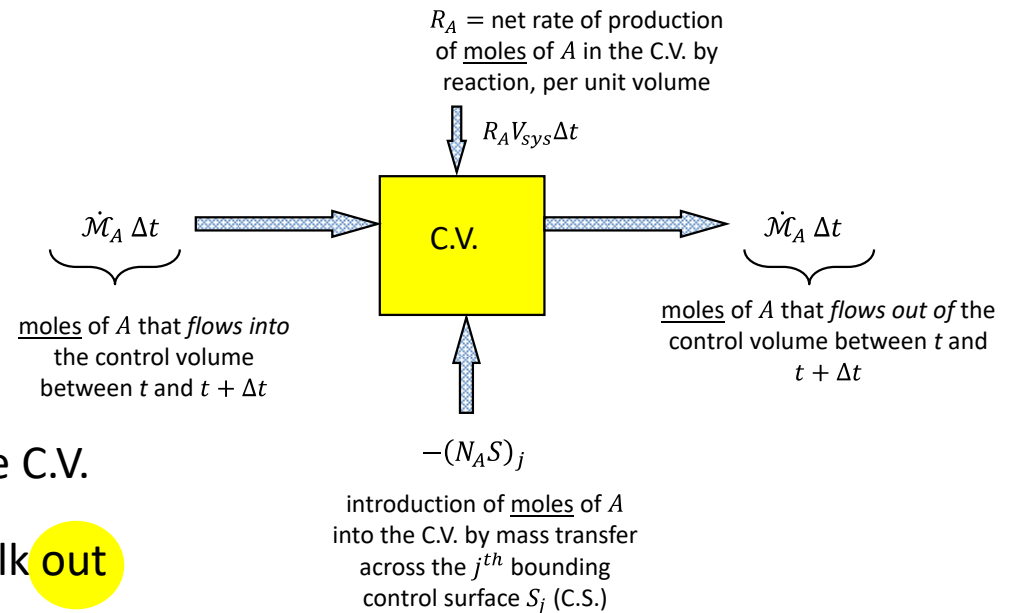


accumulation = net flow in + production + introduction

$$\frac{d}{dt} (\mathcal{M}_{A,sys}) = -\Delta \dot{\mathcal{M}}_A + R_A V_{sys} - \sum_j (N_A S)_j$$



$$\mathcal{M}_{A,sys} = c_A V_{sys} = \text{total moles of } A \text{ in the C.V.}$$

$$\Delta \dot{\mathcal{M}}_A = \sum_{j,outs} \dot{\mathcal{M}}_{A,j} - \sum_{j,ins} \dot{\mathcal{M}}_{A,j} = \text{bulk out}$$

R_A = net rate of production of moles of A in the C.V. by reaction, per unit volume

V_{sys} = system volume

N_{Aj} = $K \Delta c_{df}$ = molar flux of A out through the j^{th} C.S.

$$S_{sys} = \sum_j S_j$$

Δ is "out" - "in"

C.S. = control surface

C.V. = control volume