

Lecture 31 (11/15/2021)

* Prayer

* Spiritual thoughts

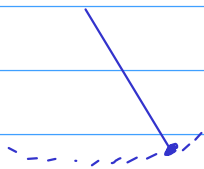
* System of ODEs: arising naturally from real life when there are interactions between objects.



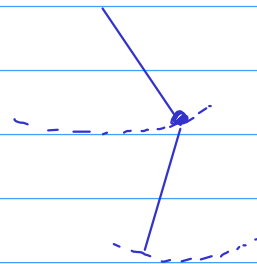
single 2nd order
ODE



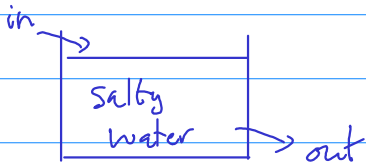
system of two 2nd
order ODE



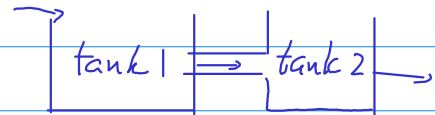
single 2nd order
ODE



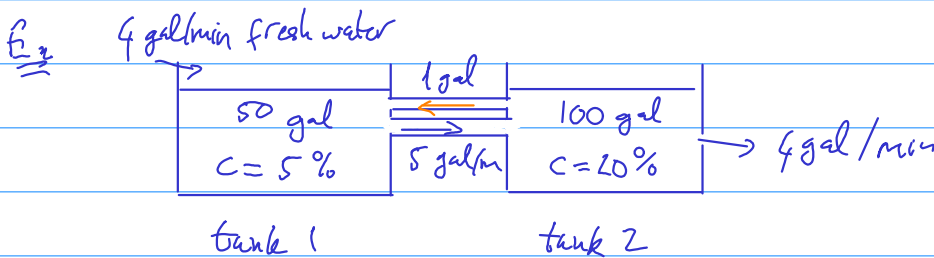
system of two 2nd
order ODE



single 1st order
ODE



system of two 1st order ODEs



y_1 ---- salt in tank 1 (lbs)

$$y_1(0) = 5\% \times 50 = 2.5$$

y_2 ---- salt in tank 2 (lbs)

$$y_2(0) = 20\% \times 100 = 20$$

y_i' = salt in - salt out

$$= 1 \times \frac{y_2}{100} - 5 \times \frac{y_1}{50} = \frac{y_2}{100} - \frac{y_1}{10}$$

$$y_2' = \text{salt in} - \text{salt out}$$

$$= 5 \times \frac{y_1}{50} - 1 \times \frac{y_2}{100} - 4 \times \frac{y_2}{100}$$

$$= \frac{y_1}{10} - \frac{y_2}{20}$$