

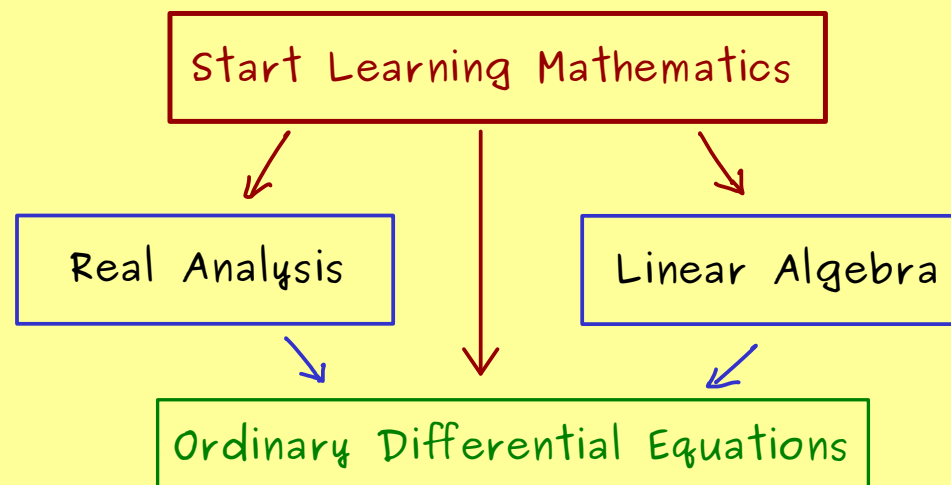


## Ordinary Differential Equations – Part 1

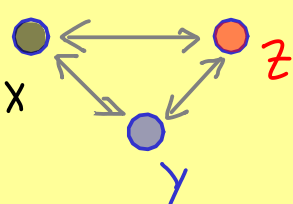
$$f' = f \leftarrow$$

search for a function  $f$  that satisfies this?

$$f(x) = e^x$$



Other examples: (a)  $\ddot{x} = -\omega^2 x$  (harmonic oscillator) (second order derivatives)

(b)   $m \cdot \ddot{x} = F$   
 $m \cdot \ddot{y} = F$   
 $m \cdot \ddot{z} = F$  } system of differential equations

- Topics:
- system of ordinary differential equations (ODE)
  - solution methods
  - existence and uniqueness of solutions
  - linear ordinary differential equations (matrix exponential function)