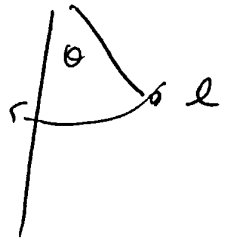
4.9)

Analysis of Mass-Spring oscillations

MA 341

dependent variable y:



$$m\frac{d^2y}{dt^2} + b\frac{dy}{dt} + ky = F_{ext}$$

Let $F_{ext} = 0$ "free Motion"

$$m\frac{d^2y}{dt^2} + b\frac{dy}{dt} + ky = (e) \quad \text{← method of undet. Coeffs}$$

homo ▷ first char eqn. ▷

$$m\lambda^2 + b\lambda + k = 0$$

↑ char. eqn

$$\lambda = \frac{-b \pm \sqrt{b^2 - 4mk}}{2m}$$

$y(0) = \frac{1}{4}$, $y'(0) = 0$, IVP

$y(0) = \frac{\pi}{4}$, $y(2\pi) = \frac{\pi}{8}$, BVP