

AP SOLUTION

(HW #10)

(AP) SUPPOSE $T(y) = \lambda y$

THEN $y'' = \lambda y$

CASE 1 $\lambda > 0$

AUX $r^2 = \lambda \Rightarrow r = \pm \sqrt{\lambda}$

THEN $y(t) = Ae^{\sqrt{\lambda}t} + Be^{-\sqrt{\lambda}t}$ ← EIGENVECTORS
CORRESPONDING TO $\lambda > 0$

CASE 2 $\lambda = 0$

AUX $r^2 = 0 \Rightarrow r = 0$ (REPEATED)

THEN $y(t) = Ae^{0t} + Bte^{0t} = A + Bt$ ← " $\lambda = 0$

CASE 3 $\lambda < 0$

AUX $r^2 = -\lambda \Rightarrow r = \pm \sqrt{-\lambda} i$

THEN $y(t) = A \cos(\sqrt{-\lambda}t) + B \sin(\sqrt{-\lambda}t)$ ← " $\lambda < 0$

