

DEN Homework 05 – solution

1. $\lambda^2 + 2\lambda = \lambda(\lambda + 2) = 0 \implies \lambda = 0, -2.$

General solution $y(x) = a + b e^{-2x}, x \in \mathbb{R}.$

Particular solution: $y(x) = 13 - e^{-2x}, x \in \mathbb{R}.$

Bonus: $y(x) \sim a$ as $x \rightarrow \infty.$

2. $\lambda^3 - 2\lambda^2 + 4\lambda - 8 = (\lambda - 2)(\lambda^2 + 4) = 0 \implies \lambda = 2, \pm 2i.$

General solution $y(x) = a e^{2x} + b \cos(2x) + c \sin(2x), x \in \mathbb{R}.$

$y(x) \sim a e^{2x}$ as $x \sim \infty.$