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ENG 381 Assignment

Question

$$\frac{d^2y}{d\theta^2} + 4\frac{dy}{d\theta} + 5y = 6\sin\theta$$

Solution

$$y'' + 4y' + 5y = 6\sin\theta$$

$$y = e^{kn}, y' = ke^{kn}, y'' = k^2e^{kn}$$

$$y'' + 4y' + 5y = 0$$

$$k^2e^{kn} + 4ke^{kn} + 5e^{kn} = 0$$

$$e^{kn}(k^2 + 4k + 5) = 0$$

$$k^2 + 4k + 5 = 0$$

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-4 \pm \sqrt{16 - 20}}{2} = \frac{-4 \pm \sqrt{-4}}{2}$$

$$= \frac{-4 \pm 2i}{2} = -2 \pm i$$

$$k_{1,2} = -2 \pm i, k_1 = -2 + i, k_2 = -2 - i$$

$$g-f = e^{mn} [C \cos mn + C_1 \sin mn] + e^{mn} [C \cos mn + C_1 \sin mn]$$

$$y = e^{-2n} [C \cos n + C_1 \sin n] + e^{-2n} [C \cos n + C_1 \sin n]$$

$$y'' = e^{-2n} \cdot -C \sin n + -2e^{-2n} \cdot C \cos n - 2e^{-2n} \cdot C_1 \sin n + e^{-2n} \cdot C_1 \cos n$$