Diferansiyel Denklemler

$$2y'' - 5y = e^x cosx$$

$$2r^2 - 5 = 0$$

$$r_{1,2} = \pm\sqrt{\frac{5}{2}}$$

$$y_h = c_1 e^{\sqrt{\frac{5}{2}}} + c_2 e^{-\sqrt{\frac{5}{2}}}$$

$$e^{\alpha x}\sin\beta x, e^{\alpha x}\cos\beta x \;\Big|\; \alpha \pm i\beta \;\Big|\; e^{\alpha x}\left(A\cos\beta x + B\sin\beta x\right)$$

$$y_{ö} = e^x Acosx + e^x Bsinx$$

$$y'_{ö} = -e^x Asinx + e^x Acosx + e^x Bcosx + e^x Bsinx$$

$$y''_{ö} = -e^x Asinx - e^x Acosx + e^x Acosx - e^x Asinx + e^x Bcosx - e^x Bsinx + e^x Bsinx + e^x Bcosx$$

$$= 2e^x Bcosx - 2e^x Asinx$$

$$yerine\ koyarsak$$

$$4e^x Bcosx - 4e^x Asinx - 5e^x Bsinx - 5e^x Acosx = e^x cosx$$

$$\underbrace{(4B - 5A)}_{1} e^x cosx + \underbrace{(-4A - 5B)}_{0} e^x \sin x = e^x \cos x$$

$$4B = -5A \Rightarrow B = -\frac{5}{4}A$$

$$4B - 5A = 1$$

$$B\ nin\ yerine\ A\ eşitini\ yazarsak$$

$$-5A - 5A = 1$$

$$A = -\frac{1}{10}$$

$$B = -\frac{5}{40}$$

$$y_g = y_h + y_{ö}$$

$$y_g = y_h = c_1 e^{\sqrt{\frac{5}{2}}} + c_2 e^{-\sqrt{\frac{5}{2}}} + e^x(-\frac{1}{10}\cos x - \frac{5}{40} sinx)$$