$$\frac{d^2u}{dy^2} + 16u = 0 \qquad \frac{d^2u}{dy^2} = r^2 \cdot e^{rt}$$

$$r^2 \cdot e^{ry} + 16 \cdot e^{ry} = 0 \qquad u(y) = e^{rt}$$

$(r^2+16) \cdot e^{ry} = 0$ vi finder rødder.

$r^2 + 16 = 0$

$r = 4i$

da det er en kompleks rod bruger vi løsningen:

$u(y) = A \cdot e^{ky} \cdot \cos(\omega y) + B \cdot e^{ky} \cdot \sin(\omega y)$

hvor $r = k \pm \omega i$

$r = 0 \pm 4i$

$u(y) = A \cdot e^{0 \cdot y} \cdot \cos(4y) + B \cdot e^{0y} \cdot \sin(4y)$

$u(y) = \underline{\underline{A \cdot \cos(4y) + B \cdot \sin(4y)}}$

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opg 2

$$\frac{d^2u}{dy^2} = 0 \qquad \frac{d^2u}{dy^2} = r^2 \cdot e^{ry}$$

$r^2 \cdot e^{ry} = 0 \qquad u(y) = A \cdot e^{ry} + B \cdot y \cdot e^{ry}$

$u(y) = A e^{0y} + B \cdot y \cdot e^{0y}$

$= \underline{\underline{A + By}}$

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opg 3.

first order homogeneus.

$$\frac{du}{dy} + 2y \cdot u(y) \qquad u(y) = e^{-G(y)} \cdot \int h(y) \cdot e^{G(y)} \, dy$$

$G(y) = \int 2y \cdot u(y) \, dy$

$= 2 \cdot \frac{1}{2} y^2 = y^2$

$u(y) = e^{-y^2} \cdot \int 0 \cdot e^{y^2} \, dy$

$u(y) = \underline{\underline{e^{-y^2} \cdot c}}$

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opg 4

integrating factor

$$\frac{du}{dy} + u(y) = e^{xy} \qquad G(y) = \int 1 \, dy = y$$

$u(y) = e^{-G(y)} \cdot \int h(y) \cdot G(y) \, dy$

$u(y) = e^{-y} \cdot \int e^{xy} \cdot e^{y} \, dy$

$= e^{-y}.$

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opg 5

$$\frac{d^2u}{dx^2} = 4y^2 \cdot u(y)$$