

7.2.36.

$$y'' - 4y' = 6e^{3t} - 3e^{-t}, \quad y(0) = 1, \quad y'(0) = -1$$

Laplacetransformera.

$$s^2 Y(s) - sy(0) - y'(0) - 4(sY(s) - y(0)) = 6 \frac{1}{s-3} - 3 \frac{1}{s+1}$$

$$(s^2 - 4s)Y(s) = s - 5 + 6 \frac{1}{s-3} - 3 \frac{1}{s+1}$$

$$Y(s) = \frac{s-5}{(s-4)s} + \frac{6}{(s-4)s(s-3)} - \frac{3}{(s-4)s(s+1)}$$

$$Y(s) = \frac{-\frac{1}{4}}{s-4} + \frac{\frac{5}{4}}{s} + \frac{\frac{6}{4}}{s-4} + \frac{\frac{2}{4}}{s} - \frac{2}{s-3} - \frac{\frac{3}{20}}{s-4} + \frac{\frac{3}{4}}{s} - \frac{\frac{3}{5}}{s+1}$$

$$Y(s) = \frac{\frac{5}{2}}{s} + \frac{\frac{11}{10}}{s-4} - \frac{2}{s-3} - \frac{\frac{3}{5}}{s+1}$$

Återtransformera.

$$y(t) = \frac{5}{2} + \frac{11}{10} e^{4t} - 2e^{3t} - \frac{3}{5} e^{-t}$$

with(DEtools):

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dsolve({diff(y(t),t$2)=4*diff(y(t),t)+  
6*exp(3*t)-3*exp(-t),y(0)=1,D(y)(0)=-1},y(t));
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$$y(t) = -\frac{1}{5} \exp(3t) (10 + 3 \exp(-4t)) + \frac{5}{2} + \frac{11}{10} \exp(4t)$$