

6.01*

lördag 17 februari 2024

18:54

$$f \cdot g(t) = \int_{-\infty}^{+\infty} f(t-\tau)g(\tau)d\tau =$$

$$= \int_{-\infty}^{\infty} e^{-(t-\tau)} \cdot \theta(t-\tau) \cdot e^{-3\tau} \cdot \theta(\tau) d\tau =$$

$$= \int_{-\infty}^{\infty} e^{-(t+2\tau)} \cdot \theta(t-\tau) \cdot \theta(\tau) d\tau =$$

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$$= \left(\int_0^t e^{-(t+2\tau)} d\tau \right) \theta(t) = \left[-\frac{e^{-(t+2\tau)}}{2} \right]_0^t \theta(t) =$$

$$= \frac{1}{2} (e^{-t} - e^{-3t}) \theta(t)$$