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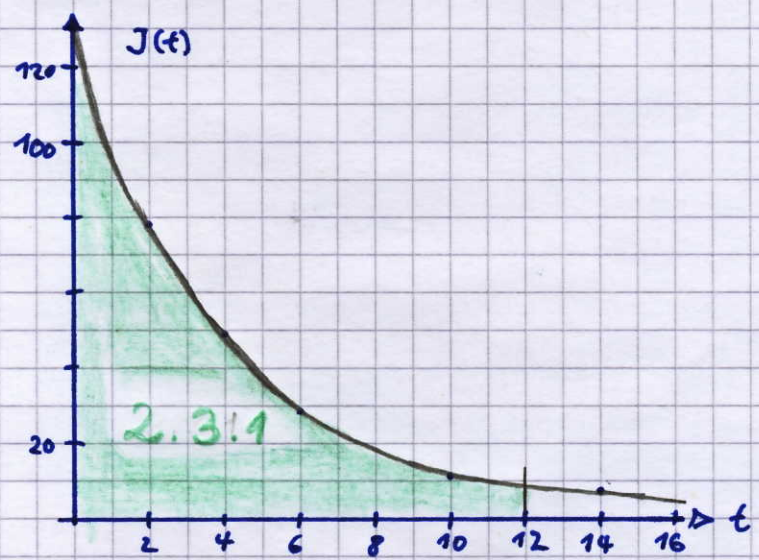
Anwendungen e-fu.				Blatt

AP 2002 / AI

2.1. $J(t) < 0{,}05\,J(0) \Leftrightarrow 130 \cdot e^{-0{,}25t_E} < 0{,}05 \cdot 130 \quad | \ln$

$\Leftrightarrow -0{,}25t_E < \ln(0{,}05) \ | \cdot(-4) < 0 \Leftrightarrow t_E > -4\ln(0{,}05) \approx 11.98$



2.3.1 $\int_0^{t_E} J(t)\,dt = \left[-4 \cdot 130\, e^{-0{,}25t}\right]_0^{t_E=12} = -520\,e^{-0{,}25t_E} + 520$

$Q(12) = 520 - 520 \cdot e^{-3} \approx 494$

2.3.2 $Q_{max} = \lim_{t_E \to \infty} Q(t_E) = \lim_{t_E \to \infty} \left(520 - \underbrace{520 \cdot e^{-0{,}25t_E}}_{\to 0}\right) = 520$

$\frac{Q(12)}{Q_{max}} = \frac{494}{520} = 0{,}95 = 95\%$

AP 2003 / AII

2.1 $v(0) = 0$; $\lim_{t \to \infty} v(t) = \lim \left(15 - \underbrace{15e^{-0{,}654t}}_{\to 0}\right) = 15$

Der Körper startet mit $v_0 = 0$ und nähert sich $v = 15$ asymptot.

2.2 $v(t) = 15 \cdot (1 - e^{-0{,}654}) = 9 \Leftrightarrow -0{,}654t = \ln 0{,}4 \Leftrightarrow t \approx 1.4$

2.3 $a(t) = \dot{v}(t) = -15 \cdot e^{-0{,}654t} \cdot (-0{,}654)$; $a(0) \approx 9{,}81$; $a(1.4) \approx 3{,}9$

2.4 $\Delta s = \int_{t_0}^{t_1} v(t)\,dt = \int_0^{1.4} (15 - 15e^{-0{,}654t})\,dt =$

$= \left[15t - \frac{15}{-0{,}654} e^{-0{,}654t}\right]_0^{1.4} = 15 \cdot 1.4 + \frac{15e^{-0{,}654 \cdot 1.4}}{0{,}654} - \frac{1}{0{,}654} \approx 7{,}2$