Laplace-Transformation

Stufe 2: Rücktransformation

Name: _____ Datum: _____

Bestimme die Originalfunktion f(t): erst Partialbrüche, dann zurück mit der Tabelle.

1) $L^{-1}\left\{\frac{s-1}{s^2+1}\right\}$ _____

2) $L^{-1}\left\{\frac{3s+1}{s^2+1}\right\}$ _____

3) $L^{-1}\left\{\frac{4s-6}{s^2+9}\right\}$ _____

4) $L^{-1}\left\{\frac{2s-2}{(s-3)(s-2)}\right\}$ _____

5) $L^{-1}\left\{\frac{4s-10}{(s-3)(s-1)}\right\}$ _____

6) $L^{-1}\left\{\frac{6s+6}{(s+3)(s-1)}\right\}$ _____

7) $L^{-1}\left\{\frac{2s-8}{(s-3)(s-1)}\right\}$ _____

8) $L^{-1}\left\{\frac{-s+6}{s^2+4}\right\}$ _____

9) $L^{-1}\left\{\frac{-10}{(s-1)(s+4)}\right\}$ _____

10) $L^{-1}\left\{\frac{2s+1}{s^2+1}\right\}$ _____

Lösungen: Laplace-Transformation

Stufe 2: Rücktransformation

1) $\frac{s}{s^2+1} - \frac{1}{1} \cdot \frac{1}{s^2+1} \Rightarrow f(t) = \cos(t) - \sin(t)$

2) $3\frac{s}{s^2+1} + \frac{1}{1} \cdot \frac{1}{s^2+1} \Rightarrow f(t) = 3\cos(t) + \sin(t)$

3) $4\frac{s}{s^2+9} - \frac{6}{3} \cdot \frac{3}{s^2+9} \Rightarrow f(t) = 4\cos(3t) - 2\sin(3t)$

4) $\frac{2s-2}{(s-3)(s-2)} = \frac{4}{s-3} - \frac{2}{s-2} \Rightarrow f(t) = 4e^{3t} - 2e^{2t}$

5) $\frac{4s-10}{(s-3)(s-1)} = \frac{1}{s-3} + \frac{3}{s-1} \Rightarrow f(t) = e^{3t} + 3e^{t}$

6) $\frac{6s+6}{(s+3)(s-1)} = \frac{3}{s+3} + \frac{3}{s-1} \Rightarrow f(t) = 3e^{-3t} + 3e^{t}$

7) $\frac{2s-8}{(s-3)(s-1)} = -\frac{1}{s-3} + \frac{3}{s-1} \Rightarrow f(t) = -e^{3t} + 3e^{t}$

8) $-\frac{s}{s^2+4} + \frac{6}{2} \cdot \frac{2}{s^2+4} \Rightarrow f(t) = -\cos(2t) + 3\sin(2t)$

9) $\frac{-10}{(s-1)(s+4)} = -\frac{2}{s-1} + \frac{2}{s+4} \Rightarrow f(t) = -2e^{t} + 2e^{-4t}$

10) $2\frac{s}{s^2+1} + \frac{1}{1} \cdot \frac{1}{s^2+1} \Rightarrow f(t) = 2\cos(t) + \sin(t)$