6.10*

lördag 17 februari 2024 18:56

s. 76

$t > 0 \qquad g(t) = \cos t$

$$\theta(t)\int_0^t \cos(t-\tau)\cdot f(\tau)\,d\tau = \sin 2t \cdot \theta(t) \iff$$

$$\iff \underbrace{g\,\theta(t)}_{G} \cdot f(t)\,\theta(t) = \underbrace{\sin 2t\,\theta(t)}_{H} \iff$$

$$\iff G \cdot F = H \iff \frac{s}{s^2+1}\cdot F = \frac{2}{s^2+2^2} \iff$$

$$\iff F = \frac{2s^2+2}{s\cdot(s^2+2^2)} = \frac{A}{s} + \frac{Bs+C}{s^2+2^2} =$$

$$= \frac{1}{2}\cdot\frac{1}{s} + \frac{3}{2}\cdot\frac{s}{s^2+2}$$

$$f(t) = \frac{1}{2} + \frac{3}{2}\cos 2t \,, \quad t > 0$$