

Problem 7 in Section 7.3. Find the inverse Laplace transform of $F(s) = \frac{1}{s^2+4s+4}$.

Solution. Observe that

$$\mathcal{L}^{-1}\left(\frac{1}{s^2+4s+4}\right) = \mathcal{L}^{-1}\left(\frac{1}{(s+2)^2}\right).$$

We know $\mathcal{L}^{-1}\left(\frac{1}{s^2}\right) = t$. It follows that $\mathcal{L}^{-1}\left(\frac{1}{(s+2)^2}\right) = \boxed{te^{-2t}}$.