

Example 2.6

$$\mathcal{Z}(te^{-at}) = ?$$

Solution

$$\begin{aligned}\mathcal{Z}(te^{-at}) &= \mathcal{Z}(t) \Big|_{z=ze^{aT}} \\ &= \frac{T z^{-1}}{(1 - z^{-1})^2} \Big|_{z=ze^{aT}}\end{aligned}$$

$$= \frac{T z^{-1} e^{-aT}}{(1 - z^{-1} e^{-aT})^2}$$