

Example 7.10 (Time-domain shifting property). Find the Laplace transform X of

table of LT pairs

$$x(t) = u(t - 1).$$

Solution. From Table 7.2, we know that

$$u(t) \xleftrightarrow{\text{LT}} 1/s \text{ for } \text{Re}(s) > 0. \quad \leftarrow \text{from LT table}$$

Using the time-domain shifting property, we can deduce

shift by 1

$$x(t) = u(t - 1) \xleftrightarrow{\text{LT}} X(s) = e^{-s} \left(\frac{1}{s} \right) \text{ for } \text{Re}(s) > 0.$$

multiply by e^{-s}

ROC unchanged

Therefore, we have

$$X(s) = \frac{e^{-s}}{s} \text{ for } \text{Re}(s) > 0. \quad \blacksquare$$