$$\boxed{T(\tau)\tilde{x}(t) = \tilde{x}(t+\tau)}$$

$$T(\tau) = \begin{bmatrix} 1 & \frac{1}{1!}\tau & \frac{1}{2!}\tau^2 & \dots \\ 0 & 1 & \frac{1}{1!}\tau & \dots \\ 0 & 0 & 1 & \ddots \\ 0 & 0 & 0 & \ddots \end{bmatrix}$$

$$= \exp(\tau\mathcal{D})$$

$$\text{with } \mathcal{D} = \begin{bmatrix} 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & \ddots \\ 0 & 0 & 0 & 0 \end{bmatrix}$$