Exercises

E16.2 [19M] Let p be a polynomial (with complex coefficients); fix $\theta \in \mathbb{C}, \theta \neq 0$. Define $f(x) = -\int_0^x e^{-\theta t} p(t)\, \mathrm{d}t$. Show that $f(x) = e^{-\theta x} q(x) - q(0)$ where q is a polynomial that has the same degree as p. Determine the linear map (i.e. the matrix) that transforms the coefficients of p into the coefficients of q; and its inverse.

Solution 1. [19N]