Exercises

18.19 [1MG] Prerequisites:Section . [2CM],[118], [11J], [11F], [1M5].

We equip the space of the matrices $\mathbb{C}^{n\times n}$ with one of the norms seen in Section [2CN].

- Show that the series $\sum_{k=0}^{\infty} A^k/k!$ converges.
- Show that

$$\exp(A) = \lim_{N\to\infty} \left(\mathbb{I} + A/N\right)^N \tag{18.19}$$

where $\mathbb{I}$ is the identity matrix in $\mathbb{R}^{n\times n}$; and that convergence is uniform in every compact neighborhood of A. *(Hint: make good use of the similar result [1M5].)*

Solution 1. [1MH]