

**Proposition 23.26.** [1SR] Given parameters  $y_0, \dots, y_{n-1} \in \mathbb{C}$ , and also  $\alpha \in \mathbb{C}$ , the solution of the Cauchy problem

$$\begin{cases} p(D)f = e^{\alpha x} \\ f(0) = y_0, \\ \dots \\ f^{n-1}(0) = y_{n-1} \end{cases}$$

exists for all times, and depends continuously on the parameters  $\alpha, y_0, \dots, y_{n-1} \in \mathbb{C}$ .