Exercises

E23.7 [1QV] Set $\alpha > 1$ and consider

$$\begin{cases} x'(t) = |x(t)|^{\alpha} \\ x(t_0) = x_0 \end{cases},$$

with $x_0, t_0 \in \mathbb{R}$ fixed. Show that there is existence and uniqueness of the solution; calculate the maximal definition interval; Use the variable separation method to explicitly calculate solutions. (Since the equation is autonomous, one could assume that $t_0 = 0$, but the example is perhaps clearer with a generic t_0).

Solution 1. *[1QW]*