

Third set of Problems. Third part of three.

1. Consider the Initial Value Problem

$$\begin{cases} \dot{x} &= f(x, t) \\ x(0) &= x_0 \end{cases}$$

where $f : D \times [0, T] \rightarrow \mathbb{R}$, with D compact, has Lipschitz constant K with respect x . Find a minimal time of existence $T' > 0$ such that the orbit does not leave a compact subdomain $D'(\subset \overset{\circ}{D})$.

2. Explain how to use rigorous higher order integrators for evaluating the following functions: $e^x, \sin(x), \cos(x)$.
3. Explain how to generalize rigorous higher order integrators for n dimensional ODEs.