

## Mathematics 5410

### Picard-Lindelof Project

The Project: State and prove the Picard-Lindelof theorem for existence and uniqueness of the initial value problem

$$y' = f(t, y), \quad y(t_0) = y_0,$$

subject to the ground rules below.

#### **The rules.**

1. Assume  $f$  and  $y$  are scalar functions.
2. Assume  $f$  satisfies a local Lipschitz condition and  $f$  is continuous.
3. The proof applies the Banach contraction mapping theorem. In particular, do not repeat material found in Kreider-Ostberg Sections 9.1, 9.2, 9.3. Simply cite the results as needed.
4. Make the proof brief and easy to read.
5. Submit by 15 November 2004.