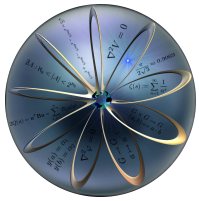

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## existence and uniqueness of solution of ordinary differential equations

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Let $E \subset W$ where $E$ is an open subset of $W$ which is a normed vector space, and let $f$ be a continuous differentiable map

$$f : E \to W.$$

Then the ordinary differential equation defined as

$$\dot{x} = f(x)$$

with the initial condition

$$x(0) = x_0$$

where $x_0 \in E$ has a unique solution on some interval containing zero. More specifically there exists $\alpha > 0$ such that the following is a unique function

$$x : (-\alpha, \alpha) \to E$$

such that $\dot{x} = f \circ x$ and $x(0) = x_0$.[**?**]

# References

[HS] Hirsch, W. Morris, Smale, Stephen.: Differential Equations, Dynamical Systems, And Linear Algebra. Academic Press, Inc. New York, 1974.