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Many real world phenomena can be modeled by dynamical systems that describe the evolution of phenomena over time. For example, the growth and decay equation models how a quantity changes over time. The transport equation with a flux term models the flow of a particle through a given medium. The Airy equation models the diffraction of light. Using the growth and decay equation, we can develop the foundation for an exact non-standard finite difference scheme (NSFD) which can preserve properties of the dynamical system into its discretization. Some equations require the NSFD scheme to adhere to time and space step size constraints. In this talk, we will show how to construct NSFD schemes that outperform the traditional standard finite difference schemes. (Received August 31, 2016)