



## Analysis of Periodic Nonautonomous Inhomogeneous Systems

J. Slane<sup>1\*</sup> and S. Tragesser<sup>2</sup>

<sup>1</sup> *Engineering Systems Inc., 4775 Centennial Blvd., Suite 106  
Colorado Springs, CO 80919*

<sup>2</sup> *Department of Mechanical and Aerospace Engineering,  
University of Colorado at Colorado Springs, Colorado Springs, CO 80933*

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**Abstract:** This paper addresses the analysis of a class of near-periodic systems in which the dynamics can be described by a set of nonlinear differential equations with no known equilibrium solution. Linear models are developed by performing a power series expansion about a time-periodic reference motion. The result is a nonautonomous, inhomogeneous system consisting of a set of parametrically excited linear differential equations with time-periodic forcing excitations. The method of linearization assures that the time period of the parametric and forcing excitations is the same.

Floquet theory is used to address the stability of the homogeneous parametrically excited system. However, the linear system is inhomogeneous due to the forcing excitation. A modification of Floquet theory allows the use of Floquet multipliers or characteristic exponents to analytically examine the transitory and steady-state behavior of the inhomogeneous system.

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\* Corresponding author: <mailto:jhslane@esi-co.com>