

ASYMPTOTIC STABILITY FOR EQUILIBRIA
OF NONLINEAR SEMIFLOWS
WITH APPLICATIONS TO
ROTATING VISCOELASTIC RODS, PART I

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Dedicated to Louis Nirenberg

1. Introduction

This paper establishes abstract results, which extend those of Potier-Ferry and Sobolevskii, on global existence and stability of solutions to quasilinear equations near an equilibrium point whose spectrum lies in the strict left half plane. The result may be regarded as a version of the linearization principle for quasilinear systems in a context where the main difficulty is to show that near the equilibrium shocks are suppressed by small damping. In the second part to this work, applications will be made to the dynamics of rods undergoing uniform rotation and satisfying the formal stability criteria based on the energy-momentum method of Simo, Posbergh, and Marsden.

The stability of relative equilibria of dissipationless geometrically exact rods moving in space was analyzed by Simo, Posbergh, and Marsden [1990]. Applying

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