

Abstract

We study a system of differential-algebraic equations, describing motions of a mass-spring-dashpot oscillator by three different forms of implicit constitutive relations. For some problems with fully implicit but linear constitutive laws for combined force, we find conditions for solution stability. Assuming monotone relationship between the displacement, velocity and the respective forces, we prove global existence of the solutions. For a linear spring and a dashpot with maximal monotone relationship between the damping force and the velocity, we prove the global existence and uniqueness result. We also solve this problem numerically for Coulomb-like damping term.