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Tsvetanka Sendova* (sendova@math.tamu.edu), Department of Mathematics, Texas A&M University, College Station, TX 77843-3368, and **Jay R. Walton**. *Constitutive Restrictions for Isotropic Hyperelastic Material Modeled Using Invariants of Logarithmic Strain.*

We discuss various constitutive restrictions on the strain energy W for an isotropic hyperelastic material, in the case when W is defined in terms of the invariants of the logarithmic strain, introduced by Criscione et al. (J. Mech. Phys.Solids 48 (2000) 2445). These invariants (specifying the *amount of dilatation* (K_1), the *magnitude of distortion* (K_2) and the *mode of distortion* (K_3)) are characterized with important orthogonality properties which allow the strain energy function W to be determined with improved accuracy. Central for the analysis of necessary or sufficient conditions for strong ellipticity is the derivation of a convenient expression for the Fréchet derivative of the Logarithmic strain tensor. The derived restrictions are illustrated by applying them to a model for rubbery material proposed by Criscione et al. Motivation for this study came from attempts to model the large deformation behavior of soft tissue. (Received September 20, 2005)