1057-74-144   **Yi-chao Chen*** (`chen@uh.edu`), N207 Engineering Building 1, Houston, TX 77204-4006. *Growth Mechanics and Growth of Mechanics.*

Growth mechanics studies mechanical aspects of growth (and resorption) of biological tissues. While the classical theory of mechanics has provided useful tools in such studies, some fundamental concepts of continuum mechanics need to be modified, redefined, or abandoned altogether when growth is studied. We develop a growth theory using consistent kinematical and constitutive equations. The kinematics of a growing body is described by the velocity field and a growth rate field defined on the region occupied by the body at the current time. An equation for the balance of mass is derived. For constitutive equations, we use the current configuration as the reference. The response function of a growing elastic body in the present theory gives the Cauchy stress when the body in the current grown/deformed configuration is subjected to an imaginary further elastic deformation. The form of such a response function changes constantly with growth and deformation even when the intrinsic mechanical properties of the material remain unchanged. The evolution equation for the response function is derived by considering a sequence of growth/deformation processes. An example of using the present theory to analyze the surface growth of a tree trunk is presented. (Received January 19, 2010)