

In today's class, we introduced the concept of the initial configuration, or the reference configuration, and the final configuration, or the current configuration. When tracking a point in a material through time, we can define two coordinate systems: one system that is called the material coordinates which define a point X 's initial position acting as a label that doesn't change, and the spatial coordinates that define the point X 's current position at a certain time. This leads to defining material derivatives that describe a change of a certain property of a material with respect to time. Regarding strain, we can describe the deformation of a point in the material using the deformation gradient tensor which is the partial derivative of the current configuration with respect to the initial configuration. Note that an Eulerian coordinate system is a fixed coordinate system through time and a Lagrangian coordinate system moves through time. With this in mind, we defined Green's deformation tensor, the Lagrangian finite strain tensor, the Cauchy deformation tensor, and the Eulerian finite strain tensor.