

The insight of mixture theory for the growth and remodelling of soft biological tissues

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The emergence of residual stress as due to growth and remodelling of soft biological tissues is examined at the light of the mixture theory. The focus is on a mixture composed by one elastic solid component and several fluid ones. It is shown that the standard theory is unable to predict residual stresses, unless enriched by a suitable descriptor of growth, and the Kröner--Lee multiplicative decomposition of the gradient of deformation works effectively in this respect. Conversely, thermodynamical arguments as applied in a mixtures framework suggest constitutive laws for the evolution of the growth tensor that point out the role of inhomogeneity of species in driving the emergence of residual stress.