Vandiver, Rebecca; **Goriely, Alain**

Differential growth and residual stress in cylindrical elastic structures. (English)

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Summary: Cylindrical forms are among one of Nature's fundamental building blocks. They serve many different purposes, from sustaining body weight to carrying flows. Their mechanical properties are generated through the often complex arrangements of the walls. In particular, in many structures that have elastic responses, such as stems and arteries, the walls are in a state of tension generated by differential growth. Here, the effect of differential growth and residual stress on the overall mechanical response of the cylindrical structure is studied within the framework of morpho-elasticity.

MSC:

74L15 Biomechanical solid mechanics
92C10 Biomechanics

Keywords:

nonlinear elasticity; growth; residual stress; buckling

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