Morphoelasticity
A theory of growth and instability for biological systems

Lecture Plan–Ravello September 2015

Alain Goriely

Mathematical Institute, University of Oxford

The aim of these lectures is to introduce students to the general theory of anelasticity. The context of morphoelasticity (that is the theory of growth and remodeling for biological systems) will be used for motivation but the present formalism applies to a variety of situation such as plasticity, thermoelasticity, and the theory of defects. The first part of the lectures consists in a general introduction and the development of a full one-dimensional theory. The second part consists in the general theory. The ideas of nonlinear elasticity and instability developed in the Lectures by Prof. Destrade will be used as a basis and generalized to the problem of anelastic materials. Examples will come from plant and human physiology and will include axon growth, tumour growth, stem growth, and arteries remodeling.

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