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Viscoelastic Response of Cytoskeleton: Prestress effect[1] LEN PISMEN, KONSTANTIN MOROSOV, MARCO SALM, Department of Chemical Engineering, Technion - Israel Institute of Technology — The differential elastic modulus of an active actomyosin network is computed as a function of applied stress, taking into account both thermal and motor contributions to filament compliance in the low-frequency domain. It is shown that, due to a dual nature of motors activity, increasing motor concentration may either stiffen the network due to stronger prestress or soften it due to motor agitation, in accordance with experimental data. Prestress anisotropy, which may be induced by redistribution of motors triggered by external force, causes anisotropy of elastic moduli. This helps to explain contradictory phenomena of cell fluidization and resolidification in response to transient stretch. Reshaping of epithelial cells is modeled by allowing for prestress anisotropy due to myosin redistribution.

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