Abstract Submitted
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Poisson’s ratio and microrheology of composite elastic materials
with rigid rods. MOUMITA DAS, F.C. MACKINTOSH, Vrije Universiteit — We
study both the macroscopic and micro-mechanical response of composites of rods
embedded in elastic media. We calculate the response functions, and bulk elastic
constants as functions of rod density. We find two fixed points for Poisson’s ratio in
3D composites: there is an unstable fixed point for Poisson’s ratio=1/2 (an incom-
pressible system) and a stable fixed point for Poisson’s ratio=1/4 (a compressible
system). This stable fixed point is found to be robust with respect to rod density and
extensibility. At high concentration, we recover the results for affine rod networks.
These results may help to explain recent experiments [Physical Review Letters 102,
188303 (2009)] that reported compressibility for composites of microtubules and
F-actin networks.

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