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Critical scaling in the rheology of damped random spring networks[1] BRIAN TIGHE, TU Delft — Physical, biological, and engineered materials ranging from foams and emulsions to bioppolymer and bar-joint networks can be modelled as random networks of springs. We study the oscillatory rheology of random networks immersed in a viscous background fluid, and show how their response is intimately tied to the presence or absence of floppy modes in the zero frequency limit. The rheology displays dynamic critical scaling with three different regimes: viscous fluid, elastic solid, and shear thinning power law fluid. We give scaling arguments to explain all of the critical exponents and confirm our predictions with numerics.

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