

## **A mathematical model of network elastoplasticity**

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### Abstract

A thermoplastic elastomer (TPE) is a polymeric material with rubber elasticity and is removable at high temperatures. In this talk, we present results of modeling the elastoplastic deformation of a TPE by using a network represented as a periodic graph. A TPE consists of a soft domain, which exhibits rubber elasticity, and hard domains, which act as cross-links. This structure can be represented as a graph. We introduce the tension tensor for a periodically realized graph, which induces the stress and the elasticity. The hard domains of a TPE are less robust than the cross-links of vulcanized rubber. We express this as local moves of a graph, which induce the plasticity in elongation.