# Relaxation in a class of SO(n)–invariant energies related to nematic elastomers

M. Šilhavý
Mathematical Institute of the AV ČR
Žitná 25
115 67 Prague 1
Czech Republic

**Abstract.** A class of isotropic energy functions $W$ is determined which admit explicit relaxation. Within the class, the rank 1 convex, quasiconvex, and polyconvex hulls coincide and reduce to the "Baker–Ericksen hull" $W^{be}$, i.e., the largest function below $W$ satisfying the Baker–Ericksen inequalities. The construction of $W^{be}$ is based on the monotonicity of $SO(n)$-invariant rank 1 convex functions and on the classical ordered–forces inequalities for symmetric convex functions. The class includes compressible or incompressible energies of nematic elastomers. The relaxed energy leads to a phase diagram which displays the original solid phase, a liquid phase, and one or two intermediate solid–liquid (smectic) phases.