1067-35-2360   **Gurgen Hayrapetyan*** (`hayrapet@math.msu.edu`), Department of Mathematics, Michigan State University, East Lansing, MI 48824, and **Keith Promislow**, Department of Mathematics, Michigan State University, East Lansing, MI 48824. *Spectrum of Constrained Gradient Flows of Functionalized Energies.* Preliminary report.

A fourth order partial differential operator with a small parameter and a nonlocal constraint is considered. The impact of the spectrum of the one dimensional leading part of the operator on the spectrum of the full operator in $\mathbb{R}^n$ is analyzed. It is shown that the eigenfunctions corresponding to asymptotically small eigenvalues have a separated variables form in terms of eigenfunctions of a Sturm-Liouville operator and eigenfunctions of a constrained Laplace-Beltrami operator. Several results on the effect of small perturbations on the spectral structure of certain self-adjoint linear operators are established. These results are applicable to analysis of stability of higher-order curvature driven flows that arise in modeling of solvated functionalized polymers. (Received September 22, 2010)