

The classical Liouville-Gelfand problem reads as

$$\begin{cases} \Delta u + \lambda e^u = 0, & x \in \Omega \\ u > 0, & x \in \Omega \\ u = 0, & x \in \partial\Omega, \end{cases}$$

where $\lambda > 0, \Omega \subset \mathbb{R}^N (N \geq 1)$ is an open bounded domain with smooth boundary. It arises in the study of combustible gas dynamics and prescribed curvature problems.

Here are some numerical results to the Liouville-Gelfand problem with $\lambda = 0.5$ and $\Omega = \{x \in \mathbb{R}^2 : 0.5 < |x| < 1\}$ (annulus). For more details or any comments on the results, please drop me a line at xjchen@math.tamu.edu

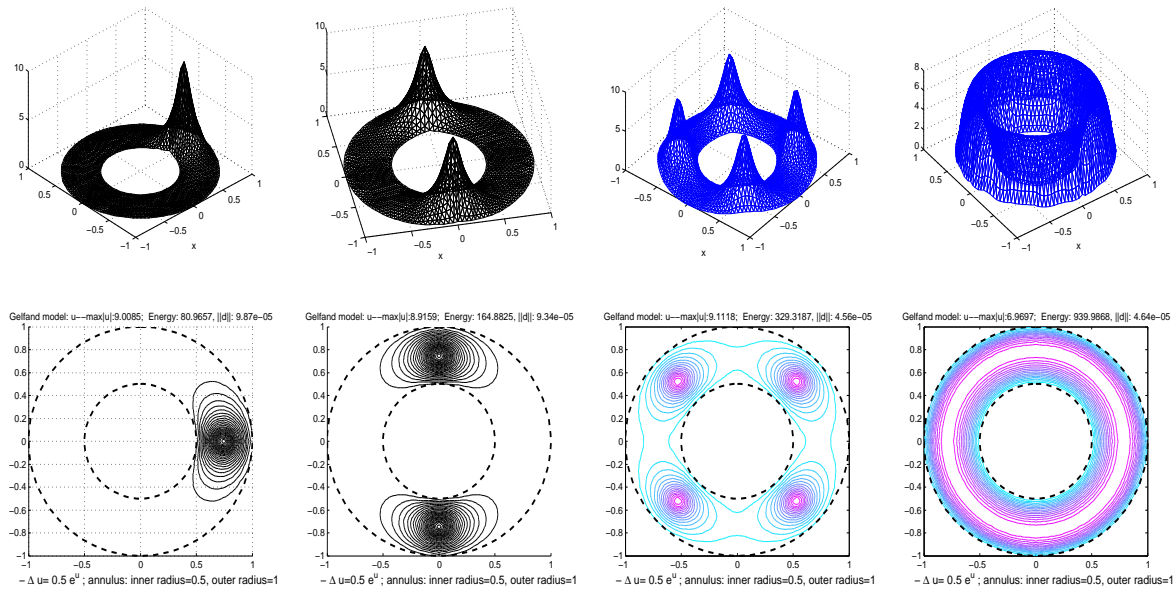


FIG. 1. Profiles (top) & contour plots (bottom) of multiple solutions to the Liouville-Gelfand problem with $\lambda = 0.5$. Note that the last solution is radially symmetric.