

# Solvability of a MEMS model driven by capillarity and pressure effects

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## Abstract

We consider the following Dirichlet problem for the singularly perturbed prescribed mean curvature equation:

$$\begin{cases} -(1 - bu) \operatorname{div} \left( \frac{\nabla u}{\sqrt{1 + |\nabla u|^2}} \right) = \frac{a}{(u - R)^2} + \frac{b}{\sqrt{1 + |\nabla u|^2}} & \text{in } \Omega, \\ u = 0 & \text{on } \partial\Omega. \end{cases} \quad (1)$$

Here  $a, b, R > 0$  are given constants and  $\Omega$  is a bounded regular domain in  $\mathbb{R}^N$ . This model appears in the theory of micro-electro-mechanical systems (MEMS) with capillarity and pressure effects. We investigate the existence and the multiplicity of solutions of problem (1), focusing the attention on the one-dimensional case.

This is a joint work with Colette De Coster, Franco Obersnel and Pierpaolo Omari.