**Toni Lassila**: *Optimal damping set of a membrane and topology discovering shape optimization*; Helsinki University of Technology, Institute of Mathematics, Research Reports A536 (2007).

**Abstract:** *We study a shape optimization problem of finding the optimal damping set of a two-dimensional membrane such that the energy of the membrane is minimized at some fixed end time. We present numerical results based on level set methods, which lead to two observations. First, that the methods presented allow for certain topological changes in the optimized shapes. These changes can be realized in the presence of a force term in the level set equation. Second, that the method of gradient descent on the manifold of shapes does not require an exact line search to converge and that it is sufficient to perform heuristic line searches that do not evaluate the cost functional being minimized.*

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