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Free boundary minimal surfaces of any topological type in euclidean balls via shape optimization (Part 1)

Maximal metrics for the isoperimetric problem for Steklov eigenvalues on Riemannian surfaces arise as induced metrics of free boundary minimal surfaces in Euclidean balls. Then it is natural to perform a variational method on Steklov eigenvalues in order to build new minimal surfaces. The program of building free boundary minimal surfaces into Euclidean balls of any topological type is now completed by this method. It is a consequence of new gap results on first eigenvalues with respect to the topology in a recent joint work with H. Matthiesen. I will give some idea of the glueing construction and the asymptotic analysis behind these results.