

Shape and Topology Optimization

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In this short course, we shall briefly review the classical method of shape sensitivity and derivation with respect to the domain (going back to Hadamard and improved by many authors since then). We describe a recent and efficient numerical implementation of this geometrical shape optimization method based on the level-set algorithm of Osher and Sethian. Although this method is not specifically designed for topology optimization, it can easily handle topology changes and its computational cost is moderate since the shape is captured on a fixed Eulerian mesh. Nevertheless, the generic ill-posedness of shape optimization is not cured by the level-set approach. Thus we describe the homogenization method which is specifically designed for relaxing ill-posed problems and for topology optimization. We discuss the relative advantages of these different methods and illustrate them by several numerical examples.

References

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