

**ON THE RELATION BETWEEN LENGTH SCALE CONTROL AND STRESS CONSTRAINTS IN DENSITY BASED
TOPOLOGY OPTIMIZATION**

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Abstract: The goal of this work is to present a new set of computational procedures for stress-constrained continuum topology optimization. The formulation exploits the link between strictly enforced length scale and stress concentration in solid bodies. The connection allows for automatic control of the maximum value of the von Mises stress by the length scale parameters. The reformulated optimization process does not require more than a single constraint, and standard optimality criteria algorithm can drive the actual solution. From a computational perspective, the proposed procedures offer a significant simplification compared to common approaches to stress constraints. Essentially, stress-constrained topology optimization is reduced to a minimum compliance problem with the additional treatment of the length scale.