

## Topology optimization of piezo modal transducers with null-polarity phases - DTU Orbit (08/11/2017)

### Topology optimization of piezo modal transducers with null-polarity phases

Piezo modal transducers in 2d can be designed theoretically by tailoring polarity of the surface electrodes. However, it is also necessary to include null-polarity phases of known width separating areas of opposite polarity in the manufacturing process in order to avoid short-circuiting. Otherwise the performance of such devices could be spoiled. In this work, we propose an appropriate topology optimization interpolation function for the electrode profile such that the effect of this new phase (hereafter gap-phase) is included in the formulation of the design problem. The approach is density-based, where the interface is controlled by including the gradient norm in the electrode profile interpolation. Through a detailed case study in 1d, conclusions on how to control the width of this gap-phase are extracted, and subsequently extended to the 2d case.

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Authors: Donoso, A. (Intern), Sigmund, O. (Intern)

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