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Design sensitivity for arch structures with respect to midsurface shape under static loading.
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We consider in this paper an example of structural optimization in which the structure is a loaded arch and the design variable is the shape of the arch. We concentrate on differentiability of static response with respect to shape changes. After recalling the arch equation with its functional spaces and the optimization problem, we state a differentiability theorem and provide a detailed proof. Numerical use of this result is finally discussed.

MSC:

49K40 Sensitivity, stability, well-posedness

49K20 Optimality conditions for problems involving partial differential equations

74P99 Optimization problems in solid mechanics

93B35 Sensitivity (robustness)

93C20 Control/observation systems governed by partial differential equations

Cited in **9** Documents

Keywords:

design sensitivity; structural optimization; loaded arch; differentiability of static response

Full Text: [DOI](#)

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