

# On Smoothing of Parametric Minimax-Functions and Generalized Max-Functions via Regularization

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**Abstract:** The paper deals with a smoothing procedure for parametric minimax-functions, arising from parameter dependent convex-concave games. In this framework generalized max-functions (i.e. maximum value functions of parametric, concave programming problems) are most important special cases of parametric minimax-functions. In general, these functions are non-differentiable and, moreover, non-locally Lipschitzian.

In this paper we suggest to smooth these functions by means of a regularization approach and prove differentiability properties and error estimates of the regularized approximations of the parametric minimax-functions. Uniform convergence (w.r.t. the parameter) of the regularized solutions to the normal solutions is shown. In particular, for generalized max-functions uniform convergence of the regularized solutions to the normal solutions of the corresponding primal and dual parametric optimization problem can be concluded. This approach gives the possibility to work without directional derivatives for these non-smooth functions and to use the usual differential calculus.

**Keywords:** parametric minimax problems, semi-infinite optimization, non-differentiable optimization, convex parametric optimization, duality theory, regularization

**Classification (MSC2000):** 90C34, 90C31, 49M45

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