An exact penalty method
for smooth equality constrained optimization
with application to maximum likelihood estimation

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Abstract: A new exact penalty function is presented which turns a smooth constrained nonlinear optimization problem into an unconstrained one. The advantage of the proposed penalty method is that arbitrary positive penalty parameters ensure local optimality, avoiding this way the possible ill-conditioning of the problem.

In a statistical example, the method was successfully applied to maximum likelihood estimation of a class of marginal models for categorical data, involving a large number of unknown parameters. Some theoretical results are given for general maximum likelihood problems with constraints.

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