

# MISQP: Mixed-Integer Sequential Quadratic Programming

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## Abstract

MISQP is a new approach for solving possibly nonconvex MINLP problems. It is an extension of the well-known SQP method to mixed-integer programs. A sequence of mixed-integer quadratic programs which are local approximations of the original MINLP determine mixed-integer search directions. The method is stabilized by a trust region and in combination with standard outer approximation techniques convergence can be shown for convex MINLPs. The method is very cheap in terms of function evaluation and achieves promising results for nonconvex black-box problems arising in the oil industry. MISQP is described in detail in Exler O., Schittkowski K. (2007): *A trust region SQP algorithm for mixed integer nonlinear programming*, Optimization Letters, Vol 1, No 3, p. 269-280.

Keywords: nonconvex MINLP; mixed integer programming; mixed integer quadratic programming; MIQP; mixed integer nonlinear programming; MINLP; numerical algorithms; Outer Approximation