
Piecewise linearization of bivariate nonlinear functions: minimizing the number of pieces under a bounded approximation error

Aloïs Duguet^{*1} and Sandra Ulrich Ngueveu²

¹LAAS-CNRS, Toulouse INP, Université fédérale de Toulouse – LAAS-CNRS, Université de Toulouse, Institut National Polytechnique de Toulouse - INPT – France

²LAAS-CNRS, Toulouse INP, Université de Toulouse – LAAS-CNRS, Université de Toulouse, Institut National Polytechnique de Toulouse - INPT – France

Abstract

This work focuses on the approximation of bivariate functions into piecewise linear ones with a minimal number of pieces and under a bounded approximation error. Applications include the approximation of mixed integer nonlinear optimization problems into mixed integer linear ones that are in general easier to solve. A framework to build dedicated linearization algorithms is introduced, and a comparison to the state of the art heuristics shows their efficiency.

^{*}Speaker