

Departamento de Matemáticas

# On parameterized achievement scalarizing functions for nonlinear multiobjective optimization

**Abstract:** Most of the methods for multiobjective optimization utilize some scalarization technique where several goals of the original multiobjective problem are converted into a single-objective problem. One common scalarization technique is to use the achievement scalarizing functions. In this talk, we introduce a new family of two-slope parameterized achievement scalarizing functions for multiobjective optimization. This family generalizes both parametrized ASF and two-slope ASF. With these two-slope parameterized ASF, we can guarantee (weak) Pareto optimality of the solutions produced, and every (weakly) Pareto optimal solution can be obtained. The parameterization of this kind gives a systematic way to produce different solutions from the same preference information. With two weighting vectors depending on the achievability of the reference point, there is no need for any assumptions about the reference point. In addition to theory, we give graphical illustrations of two-slope parameterized ASF and analyze sparsity of the solutions produced in convex and nonconvex test problems.

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