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Adriana Lara* (adriana@esfm.ipn.mx), Departamento de Matemáticas, Edificio 9, Unidad Profesional ALM IPN, del. GAM., 07738 D.F., Mexico. *Gradient-based Local Searchers for Evolutionary Algorithms in Solving Multi-objective Optimisation Problems.*

Computer Algorithms in multi-objective optimisation attempt to compute a set of trade-off solutions of the multi-objective problem (MOP). In this work, three original gradient-based methods, for solving MOPs, are designed and presented in order to be combined with Multi-objective Evolutionary Algorithms (MOEAs). They have different performances and different computational costs, in order to be used accordingly with the MOP features. Several difficulties arise when combining these two techniques. First, since we have to simultaneously minimise several functions, the gradients of the different objective functions are in conflict and must be efficiently combined. Second, the cost of performing a gradient-based descent is computationally very high. Then, it is necessary to find a compromise between the computing cost and the benefits of the local search procedure. Third, the balance of resources between the evolutionary heuristic and the (gradient-based) local search has a major impact on the overall efficiency of the hybrid MOEA. Theoretical and numerical results are presented in this work in order to show the efficiency of the proposed methods. (Received May 15, 2013)