WHEN SEMIVECTORIAL BILEVEL OPTIMIZATION REDUCES TO ORDINARY BILEVEL OPTIMIZATION[*]

Henri Bonnel[†‡]

Dedicated to Dr. Vasile Drăgan on the occasion of his 70th anniversary

Abstract

The paper deals with semivectorial bilevel optimization problems. The upper level is a scalar optimization problem to be solved by the leader, and the lower level is a multiobjective optimization problem to be solved by several followers acting in a cooperative way inside the greatest coalition, so choosing among Pareto solutions. In the so-called "optimistic problem", the followers choose among their best responses (i.e. Pareto solutions) one which is the most favorable for the leader. The opposite is the "pessimistic problem", when there is no cooperation between the leader and the followers, and the followers choice among their best responses may be the worst for the leader. The paper presents a general method which allows, under certain mild hypotheses, to transform a semivectorial bilevel problem into an ordinary bilevel optimization. Some applications are given.

MSC: 49J20, 49J27, 90C29, 90C48

keywords: Multiobjective optimization, bilevel optimization, semivectorial bilevel optimization problem