Monotone comparative statics for submodular functions, with an application to aggregated deferred acceptance

Alfred Galichon and Maxime Sylvestre

We propose monotone comparative statics results for maximizers of submodular functions, as opposed to maximizers of supermodular functions as in the classical theory put forth by Veinott, Topkis, Milgrom, and Shannon among others. We introduce matrons, a natural structure that is dual to sublattices that generalizes existing structures such as matroids and polymatroids in combinatorial optimization and M-sets in discrete convex analysis. Our monotone comparative statics result is based on a natural order on matrons, which is dual in some sense to Veinott's strong set order on sublattices. As an application, we propose a deferred acceptance algorithm that operates in the case of divisible goods, and we study its convergence properties.

You can find the PDF here : <https://arxiv.org/abs/2304.12171>.