

The Economics of Convex Function Intervals

Abstract:

« We introduce *convex function intervals* (CFIs): spaces of continuous convex functions satisfying given slope and boundary constraints. CFIs arise naturally as the constraint set of various economic design problems. We establish that CFIs are *compact* and *convex* sets. Our main results provide (i) an explicit geometric characterization of their *extreme points*; (ii) sufficient conditions for solving *linear programming* problems over CFIs; and (iii) a theory for optimization problems defined on the *lower boundary* of CFIs. We apply these results to solve optimization problems involving two-sided (weak) majorization constraints and type-dependent participation constraints, arising from information and mechanism design. Our framework also enables the analysis of the optimal design of outside options in mechanism design. »