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Optimality Conditions in Semi-Infinite and Infinite Programming.

The paper concerns the study of new classes of optimization problems of the so-called *infinite programming* that are generally defined on infinite-dimensional spaces of decision variables and contain *infinitely many* of equality and inequality constraints. These problems reduce to *semi-infinite programs* in the case of finite-dimensional spaces of decision variables. We extend the well-known Mangasarian-Fromovitz and Farkas-Minkowski constraint qualifications to these infinite programs. Under these conditions, we establish some formulas for the normal cone to the feasible set by using advanced tools of variational analysis and generalized differentiation. Then we derive first order optimality conditions for semi-infinite and infinite programs. The results obtained are new not only for the classes of infinite programs under consideration but also for their semi-infinite counterparts. (Received September 09, 2010)