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*Discovery of new complementarity functions for NCP and SOCCP*

It is well known that complementarity functions play an important role in dealing with complementarity problems. In this talk, we propose a few new classes of complementarity functions for nonlinear complementarity problems and second-order cone complementarity problems. The constructions of such new complementarity functions are based on discrete generalization which is a novel idea. Surprisingly, the new families of complementarity functions possess continuous differentiability even though they are discrete-oriented extensions. This feature enables that many methods like Newton method can be employed directly for solving nonlinear complementarity problems and second-order cone complementarity problems. This is a new discovery to the literature and we believe that such new complementarity functions can also be used in many other contexts.