DEPARTMENT OF APPLIED MATHEMATICS
應 用 數 學 系

The Hong Kong Polytechnic University
Department of Applied Mathematics

Colloquium

Weakly homogeneous variational inequalities

by

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Abstract

Given a closed convex cone C in a finite dimensional real Hilbert space H, a weakly homogeneous map $f : C \rightarrow H$ is a sum of two continuous maps h and g, where h is positively homogeneous of degree γ (> 0) on C and $g(x) = o(||x||^{\gamma})$ as $||x|| \rightarrow \infty$ in C. We denote h by f^{∞} and call it the `leading term or the recession part' of f. Examples include polynomial maps over R_{+}^{n} (where the leading term is induced by a tensor) and Riccati maps $f(X) := XAX + BX + XB^{*}$ over the cone of (real/complex) Hermitian positive semidefinite matrices.

Given a weakly homogeneous map f, a nonempty closed convex subset K of C, and a $q \in H$, we consider the variational inequality problem, VI(f, K, q), of finding an $x^{*} \in K$ such that $\langle f(x^{*}) + q, \; x - x^{*} \rangle \geq 0$ for all $x \in$ K. When K is a cone, this becomes a complementarity problem. In this talk, we describe some results connecting the variational inequality problem $VI(f, K, q)$ and the cone complementarity *problem* $VI(f^{\infty}, K^{\infty}, 0)$, where f^{∞} is the recession part of f and K^{∞} is the recession cone of K. Specializing, we extend a result of Karamardian formulated for homogeneous maps on proper cones to variational inequalities. As an application, we discuss the solvability of nonlinear equations corresponding to weakly homogeneous maps over closed convex cones.

Date : 23 October, 2017 (Monday)

Time : 3:00p.m. – 4:00p.m.

Venue : TU801, The Hong Kong Polytechnic University

*** * * ALL ARE WELCOME * * ***