Research Highlight:
Conditional Expectation and Conditional Distribution of Correspondences

Work of Professor SUN Yeneng

In many economic models, it is often the case that agents' optimal choices are non-unique, and thus the study of set-valued functions (i.e., correspondences) is important for economic theory. After John Nash's Nobel Prize winning work on game theory in the 1950s, Kakutani's Fixed Point Theorem and its generalizations for upper hemicontinuous, convex and compact valued correspondences have provided a standard tool for working with economic equilibria.

For measurable correspondences, it is natural to consider the conditional expectation or conditional distribution of their measurable selections. Prof SUN Yeneng and his coauthor HE Wei (2014 Ph.D from NUS in Mathematics) characterize the properties of convexity, compactness and upper hemicontinuity for conditional expectation and conditional distribution of correspondences in papers [1] and [2] respectively, via the "nowhere equivalence" condition. These results are then applied to large games, stochastic games, and abstract economies with asymmetric information.

References:

1. W. He, Y.N. Sun, Conditional expectation of correspondences and economic applications , E*conomic Theory* **66** (2018), 265-299.

2. W. He, Y.N. Sun, The necessity of nowhere equivalence, *Advances in Mathematics* **325** (2018), 608-639.