Date	**September 15, 2017 (Friday)**
Speaker	**Prof. Denis Tkachenko**
Affiliation	**National University of Singapore**
Paper Title	**Using Arbitrary Precision Arithmetic to Sharpen Identification Analysis for DSGE Models**
Abstract	**The paper applies arbitrary-precision arithmetic to address some practical difficulties arising in the identification analysis of DSGE models. The main focus in on results in Qu and Tkachenko (2012, 2016) since the framework appears to be the most comprehensive to date. Working with this arithmetic, we develop the following three-step procedure for analyzing local and global identification. (1) The DSGE model solution algorithm is modified so that all the relevant objects are computed as multiprecision entities. (2) The rank condition and the Kullback-Leibler distance are computed using arbitrary-precision Gauss-Legendre quadrature. (3) Minimization is carried out using arbitrary-precision versions of optimization algorithms such as MATLAB's *fminsearch*. The criterion for convergence is set based on the chosen precision level, so that whether the minimized value is zero can be effectively determined. We illustrate the details of this approach using a small scale DSGE model of Leeper (1991), which allows for analytical verification of the obtained numerical results, and a medium scale model of Schmitt-Grohe an Uribe (2012). We show that numerical issues stemming from the use of double precision arithmetic can complicate identification analysis even for simple models, but arbitrary precision arithmetic provides sharper conclusions at the cost of modestly increased computation time. We also highlight that the arithmetic may find applications in other contexts where numerical stability is of high importance, such as solving nonlinear DSGE models, inverting large matrices, and solving Lyapunov and Riccati equations. These issues are all of substantial importance to macroeconomic research. The relevant software implemenations are made available.**
Host Faculty	**Peng Wang**