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KAP 414  
3:30 PM – 4:30 PM

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***“First Passage Times of Two-Dimensional Brownian Motion”***

**Abstract:** First passage times (FPTs) of two-dimensional Brownian motion have been used to study correlated defaults under structural models of credit risk. However, despite various attempts since 1960's, there are few analytical solutions to the mathematical problems relating to FPTs. By solving a non-homogeneous, modified Helmholtz equation in an infinite wedge, we find analytical solutions for the Laplace transforms of FPTs. We show that these Laplace transforms can be numerically inverted. The FPT problems lead to a class of bivariate exponential distributions which are absolute continuous but do not have memoryless property. We also prove that the density of the absolute difference of FPTs tends to infinity if and only if the correlation between Brownian motions is positive.

This is a joint work with Haowen Zhong.