



## Department of Mathematics and Statistics

### COLLOQUIUM

**Tuesday, October 20<sup>th</sup>, 2015**

4:00 – 5:00 pm, Adel Mathematics Bldg., Room 164  
(refreshments at 3:45)

**Sooie Hoe Loke**  
**Oregon State**

## Ruin Problems with Risky Investments.

**Abstract:** In this talk, we present two risk models. First, we consider the dual risk process which models the surplus of a company that incurs expenses at a constant rate and earns random positive gains at random times. When the surplus is invested in a risky asset following a geometric Brownian motion, we show that the ruin probability decays algebraically for small volatility and that ruin is certain for large volatility. We use numerical methods to approximate the ruin probability when the surplus is invested in a risk-free asset. When there are no investments, we recover the exact expression for the ruin probability via Wiener-Hopf factorization. Second, we are concerned with incurred but not reported (IBNR) claims, modeled by delaying the settlement of each claim by a random time. When the investments follow a geometric Brownian motion, we derive a parabolic integro-partial-differential equation (IPDE) for the ultimate ruin probability with final value condition given by the ruin probability under risky investments with no delay. Assuming that the delay times are bounded by a constant, we obtain an existence theorem of the final value IPDE in the space of bounded functions, and a uniqueness theorem in the space of square integrable functions. When the delay times are deterministic, we show that delaying the settlement of claims does not reduce the probability of ruin when the volatility is large.

Algebra Combinatorics Geometry and Topology (ACGT) Seminar meets every Tuesday, 12:45 – 1:45 pm, AMB 164.

Applied Math Seminar (AMS) will meet occasionally on Thursdays, 12:45 – 1:45 pm, AMB 164, as announced.

Friday Afternoon Undergraduate Mathematics Seminar (FAMUS) meets Fridays, 3pm, AMB 164.