



The University of Chicago
Department of Statistics

MASTER'S THESIS PRESENTATION

DOROTHY BERNASKO

Department of Statistics
The University of Chicago

**Density Estimation of Cargo Vessel Groundings in the
Baltic Sea**

WEDNESDAY, November 9, 2011, at 1:00 PM

110 Eckhart Hall, 5734 S. University Avenue

ABSTRACT

Shipping accidents cost business millions of dollars every year, lead to lost business, pollution and fatalities. We consider the density estimation of groundings of cargo vessels in the Baltic Sea and on the Baltic coast.

We propose an intensity estimation model based on kernel density estimation. Kernel density estimation is a non-parametric method which makes no assumptions about the density. We compare the results to those derived from a permanental process. Permanental processes are infinitely divisible processes where the probability at a point can be estimated by a ratio of weighted permanents. The code for the permanental process simulation was provided by Jie Yang of UIC and the method was derived by both Prof. P. McCullagh and Jesper Moller.

We define the covariance for the permanental process. We compare the two estimation techniques and consider the reasons for differences.

Key words: Kernel density estimation, Cox Process, Permanental Process, Covariance

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