



*El Departamento de Estadística del ITAM*

anuncia la siguiente sesión (No. 181) de

## ***EL SEMINARIO ALEATORIO***

que, con el título

### **Asymptotics of Sums of Lognormal Random Variables with Gaussian Copula**

impartirá

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#### **Resumen**

Tail probabilities  $P(S_x > x)$  of a sum  $S_x = X_1 + \dots + X_n$  of heavy-tailed risks  $X_1 + \dots + X_n$  are of major importance in applied probability and its applications in risk management, such as the determination of risk measures like the Value-at-Risk (VaR) for given portfolios of risks, evaluation of credit risk, aggregate claims distributions in insurance, operational risk. Under the assumption of independence among the risks, the situation is well understood. In particular, from the very definition of subexponential distributions, given identical marginal distributions, the maximum among the involved risks determines the distribution of the sum and, on the other hand, for non-identical marginals the distribution of the sum is determined by the component (s) with the heaviest tail.

Over the last few years, several results in the direction of allowing dependent  $X_i$  have been developed. The overall picture is that, except for some special cases, the situation seems best understood with regularly varying marginals. However, in particular in insurance and finance, lognormal marginals is the more important case. This work deals with the basic case of lognormal marginals with a multivariate Gaussian copula:

Let  $(Y_1, \dots, Y_n)$  have a joint  $n$ -dimensional Gaussian distribution with a general mean vector and a general covariance matrix, and let  $X_i = e^{Y_i}$ ,  $S_n = X_1 + \dots + X_n$ . The asymptotics of  $P(S_n > X)$  as  $n \rightarrow \infty$  is shown to be same as for the independent case with the same lognormal marginals. In particular, for identical marginals it holds that  $P(S_x > x) \sim nP(X_1 > x)$  no matter the correlation structure.

***Fecha: Viernes 14 de Marzo***

***Hora: 13:00 hrs.***

***Salón: B-1***

**Lista de seminarios próximos. Visite:**

<http://estadistica.itam.mx/seminarios.html>

El Seminario Aleatorio está destinado tanto a profesores como a estudiantes, por lo que el Departamento de Estadística agradece a los profesores que colaboren invitando a sus alumnos a estas sesiones.

María F. Rojano Agraz

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