

TECHNISCHE UNIVERSITÄT
CHEMNITZ

TU Chemnitz, Fakultät für Mathematik, D-09107 Chemnitz

FAKULTÄT FÜR
MATHEMATIK

Chemnitz, 24. 2. 2009

Telefon:
+49 (0) 371 / 531-22430

Fax:
+49 (0) 371 / 531-22409

E-Mail:
thorsten.schmidt@mathe-
matik.tu-chemnitz.de

Einladung

Liebe Freunde der Finanzmathematik,
es ist mir eine Freude folgende Vorträge ankündigen zu können:

Lévy-Fraily Copulas

(Jan-Frederik Mai, TU München)

A Tractable Multivariate Default Model Based on a Stochastic Time-Change

(Matthias Scherer, TU München)

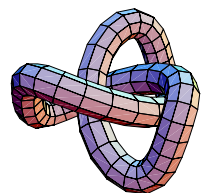
Am Donnerstag, 5. März 2009
in Chemnitz, Hörsaal 2/N013 (Orangerie)
um 15.00 Uhr.

Lévy-Fraily Copulas

A parametric family of n -dimensional extreme-value copulas of Marshall- Olkin type is introduced. Members of this class arise as survival copulas in Lévy-frailty models. The underlying probabilistic construction introduces dependence to initially independent exponential random variables by means of first-passage times of a Lévy subordinator. Jumps of the subordinator correspond to a singular component of the copula. Additionally, a characterization of completely monotone sequences via the introduced family of copulas is derived. An alternative characterization is given by Hausdorff's moment problem in terms of random variables with compact support. The resulting correspondence between random variables, Lévy subordinators, and copulas is studied and illustrated by several examples. Finally, it is used to provide a general methodology for sampling the copula in many cases. The new class is shown to share some properties with Archimedean copulas regarding construction and analytical form. Finally, the parametric form allows to compute different measures of dependence and the Pickands representation.

**Professur Finanz-
mathematik**

Prof. Dr. T. Schmidt



Dienstanschrift:
Technische Universität Chemnitz
Fakultät für Mathematik
Reichenhainer Str. 39
D-09126 Chemnitz

Postanschrift:
Technische Universität Chemnitz
D-09107 Chemnitz
Paketanschrift: siehe Dienstanschrift

Telefon: +49 (0) 371 / 531-22000
Fax: +49 (0) 371 / 531-22009
dekanat@mathematik.tu-chemnitz.de
www.tu-chemnitz.de/mathematik

Bankverbindung:
Hauptkasse des Freistaates Sachsen
Ostsächsische Sparkasse Dresden
BLZ: 850 503 00
Konto-Nr.: 315 301 137 0

A Tractable Multivariate Default Model Based on a Stochastic Time-Change

A stochastic time-change is applied to introduce dependence to a portfolio of credit-risky assets whose default times are modeled as random variables with arbitrary distribution. The dependence structure of the vector of default times is completely separated from its marginal default probabilities, making the model analytically tractable. This separation is achieved by restricting the time-change to suitable Lévy subordinators which preserve the marginal distributions. Jump times of the Lévy subordinator are interpreted as times of excess default clustering. Relevant for practical implementations is that the parameters of the time-change allow for an intuitive economical explanation and can be calibrated independently of the marginal default probabilities. On a theoretical level, a so-called time normalization allows to compute the resulting copula of the default times. Moreover, the exact portfolio-loss distribution and an approximation for large portfolios under a homogeneous portfolio assumption are derived. Given these results, the pricing of complex portfolio derivatives is possible in closed-form. Three different implementations of the model are proposed, including a compound Poisson subordinator, a Gamma subordinator, and an Inverse Gaussian subordinator. Using two parameters to adjust the dependence structure in each case, the model is capable of capturing the full range of dependence patterns from independence to complete comonotonicity. A simultaneous calibration to portfolio-CDS spreads and CDO tranche spreads is carried out to demonstrate the model's applicability.

Weitere Informationen zu den Vortragenden finden Sie auf

<http://www.mathfinance.ma.tum.de/personen/en-scherer.php> und

<http://www.mathfinance.ma.tum.de/personen/en-mai.php>

Ich freue mich über Ihr Erscheinen,

mit besten Grüßen

Thorsten Schmidt