mathematics & finance:

We hereby certify that, ***Alan De Genaro*** - **Escola de Administração de Empresas**, participated in the Mathematics & Finance: Research in Options 2020, held online by IMPA, Rio de Janeiro, November 29 – December 02, 2020 and presented the following plenary talk: “**Pricing contingent rights in Football**”.

Rio de Janeiro, December 2nd, 2020.

Jorge P. Zubelli
Organizing Committee

15th Edition

Research in Options

We hereby certify that, ***Alberto Adrego Pinto*** - **Universidade do Porto**, participated in the Mathematics & Finance: Research in Options 2020, held online by IMPA, Rio de Janeiro, November 29 – December 02, 2020 and presented the following plenary talk: “**Dynamics of fake news**”.

Rio de Janeiro, December 2nd, 2020.

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We hereby certify that, ***Andrea Macrina*** - **University College London**, participated in the Mathematics & Finance: Research in Options 2020, held online by IMPA, Rio de Janeiro, November 29 – December 02, 2020 and presented the following plenary talk: “**Quantile Diffusions**”.

Rio de Janeiro, December 2nd, 2020.

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We hereby certify that, ***Antoine Savine*** - **Danske Bank**, participated in the Mathematics & Finance: Research in Options 2020, held online by IMPA, Rio de Janeiro, November 29 – December 02, 2020 and presented the following plenary talk: “**Differential Machine Learning**”.

Rio de Janeiro, December 2nd, 2020.

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We hereby certify that, ***Beatrice Acciaio*** - **Eth-Zentrum**, participated in the Mathematics & Finance: Research in Options 2020, held online by IMPA, Rio de Janeiro, November 29 – December 02, 2020 and presented the following plenary talk: “**Model-independence in a fixed-income market and weak optimal transport**”.

Rio de Janeiro, December 2nd, 2020.

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We hereby certify that, ***Blanka Horvath*** - **King´s College London**, participated in the Mathematics & Finance: Research in Options 2020, held online by IMPA, Rio de Janeiro, November 29 – December 02, 2020 and presented the following plenary talk: "**A Data-Driven Market Simulator for Small Data Environments**".

Rio de Janeiro, December 2nd, 2020.

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We hereby certify that, ***Bruno Dupire*** - **Bloomberg - NY**, participated in the Mathematics & Finance: Research in Options 2020, held online by IMPA, Rio de Janeiro, November 29 – December 02, 2020 and presented the following plenary talk: "**The Beauty and Power of Forward Equations**".

Rio de Janeiro, December 2nd, 2020.

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We hereby certify that, ***Carole Bernard*** - **Vrije Universiteit Brussel**, participated in the Mathematics & Finance: Research in Options 2020, held online by IMPA, Rio de Janeiro, November 29 – December 02, 2020 and presented the following plenary talk: “**Improving multi-asset allocation via cost-efficient strategies**”.

Rio de Janeiro, December 2nd, 2020.

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We hereby certify that, ***Chris Rogers*** - **University of Cambridge**, participated in the Mathematics & Finance: Research in Options 2020, held online by IMPA, Rio de Janeiro, November 29 – December 02, 2020 and presented the following plenary talk: "**Things we think we know**".

Rio de Janeiro, December 2nd, 2020.

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We hereby certify that, ***Christopher Rogers*** - **University of Cambridge**, participated in the Mathematics & Finance: Research in Options 2020, held online by IMPA, Rio de Janeiro, November 29 – December 02, 2020 and presented the following plenary talk: "**Things we think we know**".

Rio de Janeiro, December 2nd, 2020.

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We hereby certify that, ***Emmanuel Gobet*** - **École Polytechnique**, participated in the Mathematics & Finance: Research in Options 2020, held online by IMPA, Rio de Janeiro, November 29 – December 02, 2020 and presented the following plenary talk: "**Weak Approximations and Vix Option Prices Expansions in Rough Forward Variances Models**".

Rio de Janeiro, December 2nd, 2020.

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We hereby certify that, ***Ernst Eberlein*** - **Universitat Freiburg - Freiburg - Alemanha**, participated in the Mathematics & Finance: Research in Options 2020, held online by IMPA, Rio de Janeiro, November 29 – December 02, 2020 and presented the following plenary talk: “**A multiple curve Lévy swap market model**”.

Rio de Janeiro, December 2nd, 2020.

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We hereby certify that, ***George Papanicolaou*** - **Stanford University**, participated in the Mathematics & Finance: Research in Options 2020, held online by IMPA, Rio de Janeiro, November 29 – December 02, 2020 and presented the following plenary talk: “**A study of principal eigenportfolios of US equities**”.

Rio de Janeiro, December 2nd, 2020.

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We hereby certify that, ***Gyorgy Varga*** - **Fce Consultoria**, participated in the Mathematics & Finance: Research in Options 2020, held online by IMPA, Rio de Janeiro, November 29 – December 02, 2020 and presented the following plenary talk: "**On the FITTING of the Term Structure Short-End**".

Rio de Janeiro, December 2nd, 2020.

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We hereby certify that, ***Jan Obloj*** - **University of Oxford**, participated in the Mathematics & Finance: Research in Options 2020, held online by IMPA, Rio de Janeiro, November 29 – December 02, 2020 and presented the following plenary talk: "**Joint Modelling and Calibration of SPX and VIX by Optimal Transport**".

Rio de Janeiro, December 2nd, 2020.

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We hereby certify that, ***Jean-Pierre Fouque*** - **University of California Santa Barbara**, participated in the Mathematics & Finance: Research in Options 2020, held online by IMPA, Rio de Janeiro, November 29 – December 02, 2020 and presented the following plenary talk: "**Reinforcement learning for mean field games and mean field control problems**".

Rio de Janeiro, December 2nd, 2020.

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We hereby certify that, ***Jim Gatheral*** - **City University of New York**, participated in the Mathematics & Finance: Research in Options 2020, held online by IMPA, Rio de Janeiro, November 29 – December 02, 2020 and presented the following plenary talk: “**Diamond trees and the forest expansion**”.

Rio de Janeiro, December $2^{nd}$, 2020.

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We hereby certify that, ***Josef Teichmann*** - **Eth-Zentrum**, participated in the Mathematics & Finance: Research in Options 2020, held online by IMPA, Rio de Janeiro, November 29 – December 02, 2020 and presented the following plenary talk: “**Semi-martingale Signatures**”.

Rio de Janeiro, December 2nd, 2020.

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We hereby certify that, ***Julien Guyon*** - **Bloomberg, Columbia University, and Nyu**, participated in the Mathematics & Finance: Research in Options 2020, held online by IMPA, Rio de Janeiro, November 29 – December 02, 2020 and presented the following plenary talk: “**VIX-constrained Schrödinger bridges: joint calibration of SPX and VIX smiles with stochastic volatility models**”.

Rio de Janeiro, December 2nd, 2020.

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We hereby certify that, ***Lane Hughston*** - **Goldsmiths University of London**, participated in the Mathematics & Finance: Research in Options 2020, held online by IMPA, Rio de Janeiro, November 29 – December 02, 2020 and presented the following plenary talk: "**Optimal Hedging in Incomplete Markets**".

Rio de Janeiro, December 2nd, 2020.

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We hereby certify that, ***Luciano Irineu de Castro Filho*** - **Instituto de Matemática Pura e Aplicada**, participated in the Mathematics & Finance: Research in Options 2020, held online by IMPA, Rio de Janeiro, November 29 – December 02, 2020 and presented the following plenary talk: “**Portfolio Selection in Quantile Decision Models**”.

Rio de Janeiro, December 2nd, 2020.

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We hereby certify that, ***Marco Avellaneda*** - **Courant Institute of Mathematical Sciences**, participated in the Mathematics & Finance: Research in Options 2020, held online by IMPA, Rio de Janeiro, November 29 – December 02, 2020 and presented the following plenary talk: "**A Brief History of CORE**".

Rio de Janeiro, December 2nd, 2020.

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We hereby certify that, ***Marco Frittelli*** - **Unicersitá Degli Studi di Milano**, participated in the Mathematics & Finance: Research in Options 2020, held online by IMPA, Rio de Janeiro, November 29 – December 02, 2020 and presented the following plenary talk: “**Entropy martingale optimal transport**”.

Rio de Janeiro, December 2nd, 2020.

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We hereby certify that, ***Martin Schweizer*** - **Swiss Federal Institute of Technology**, participated in the Mathematics & Finance: Research in Options 2020, held online by IMPA, Rio de Janeiro, November 29 – December 02, 2020 and presented the following plenary talk: "**A new look at absence of arbitrage**".

Rio de Janeiro, December 2nd, 2020.

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We hereby certify that, ***Martino Grasselli*** - **Padova University**, participated in the Mathematics & Finance: Research in Options 2020, held online by IMPA, Rio de Janeiro, November 29 – December 02, 2020 and presented the following plenary talk: “**Smile Modelling for Exchange-Traded Products on Futures Strategies**”.

Rio de Janeiro, December 2nd, 2020.

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We hereby certify that, ***Matheus Grasselli*** - **Mcmaster University**, participated in the Mathematics & Finance: Research in Options 2020, held online by IMPA, Rio de Janeiro, November 29 – December 02, 2020 and presented the following plenary talk: “**Monetary policy responses to Covid-19: a comparison with the 2008 crisis and implications for the future of central banking**”.

Rio de Janeiro, December 2nd, 2020.

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We hereby certify that, ***Nizar Touzi*** - **École Polytechnique**, participated in the Mathematics & Finance: Research in Options 2020, held online by IMPA, Rio de Janeiro, November 29 – December 02, 2020 and presented the following plenary talk: “**Is there a Golden Parachute in Sannikov’s principal-agent problem?**”.

Rio de Janeiro, December 2nd, 2020.

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We hereby certify that, ***Peter Tankov*** - **Centre de Recherche en Économie et Statistique**, participated in the Mathematics & Finance: Research in Options 2020, held online by IMPA, Rio de Janeiro, November 29 – December 02, 2020 and presented the following plenary talk: "**Price formation and optimal trading in intraday electricity markets**".

Rio de Janeiro, December 2nd, 2020.

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We hereby certify that, ***Rama Cont*** - **University of Oxford**, participated in the Mathematics & Finance: Research in Options 2020, held online by IMPA, Rio de Janeiro, November 29 – December 02, 2020 and presented the following plenary talk: “**Excursions in Mathematical Finance**”.

Rio de Janeiro, December 2nd, 2020.

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We hereby certify that, ***Raphael Douady*** - **Université Paris I - Sorbonne**, participated in the Mathematics & Finance: Research in Options 2020, held online by IMPA, Rio de Janeiro, November 29 – December 02, 2020 and presented the following plenary talk: "**SABR Type Stochastic Volatily Operator in Hilbert Space**".

Rio de Janeiro, December 2nd, 2020.

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We hereby certify that, ***Roger Lee*** - **University of Chicago**, participated in the Mathematics & Finance: Research in Options 2020, held online by IMPA, Rio de Janeiro, November 29 – December 02, 2020 and presented the following plenary talk: “**Optimal Trading: a Filtering Approach with Explicit Solutions**”.

Rio de Janeiro, December 2nd, 2020.

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We hereby certify that, ***Sebastian Jaimungal*** - **University of Toronto**, participated in the Mathematics & Finance: Research in Options 2020, held online by IMPA, Rio de Janeiro, November 29 – December 02, 2020 and presented the following plenary talk: “**A Mean-Field Game Approach to Equilibrium Pricing in Renewable Energy Certificate Markets**”.

Rio de Janeiro, December 2nd, 2020.

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We hereby certify that, ***Stéphane Crépey*** - **Université de Paris**, participated in the Mathematics & Finance: Research in Options 2020, held online by IMPA, Rio de Janeiro, November 29 – December 02, 2020 and presented the following plenary talk: “**Deep XVA Analysis**”.

Rio de Janeiro, December 2nd, 2020.

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We hereby certify that, ***Teemu Pennanen*** - **King´s College London**, participated in the Mathematics & Finance: Research in Options 2020, held online by IMPA, Rio de Janeiro, November 29 – December 02, 2020 and presented the following plenary talk: "**Convex stochastic optimization - Dynamic programming and duality in discrete time**".

Rio de Janeiro, December 2nd, 2020.

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