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CERTIFICATE

We hereby certify that, ***Carole Bernard*** - **Vrije Universiteit Brussel**, participated in the Mathematics & Finance: Research in Options 2019, held at IMPA, Rio de Janeiro, November 29 – December 05, 2019 and presented the following minicourse : "**The rearrangement algorithm: a useful tool to measure model risk when aggregating risks in portfolio selection, but also to price basket options, or to infer dependence using option prices**".

Rio de Janeiro, December 5th, 2019.

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We hereby certify that, ***Lakshithe Wagalath*** - **Iéseg School of Management**, participated in the Mathematics & Finance: Research in Options 2019, held at IMPA, Rio de Janeiro, November 29 – December 05, 2019 and presented the following minicourse : "**Feedback effects and endogenous risk in financial markets**".

Rio de Janeiro, December 5th, 2019.

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We hereby certify that, ***Matheus Grasselli*** - **Mcmaster University**, participated in the Mathematics & Finance: Research in Options 2019, held at IMPA, Rio de Janeiro, November 29 – December 05, 2019 and presented the following minicourse : "**Finance and Climate Change**".

Rio de Janeiro, December 5th, 2019.

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We hereby certify that, ***Thomas Hurd*** - **Mcmaster University**, participated in the Mathematics & Finance: Research in Options 2019, held at IMPA, Rio de Janeiro, November 29 – December 05, 2019 and presented the following minicourse : "**The Eisenberg-Noe Paradigm for Financial Systemic Risk**".

Rio de Janeiro, December 5th, 2019.

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