UNIVERSITÀ DI TRENTO
Dipartimento di Matematica

DOTTORATO

CYCLE 33th
ORAL DEFENCE OF THE PHD THESIS

Wednesday 27 April 2022 – at 10:30 am
Seminar room "-1"

The event will take place online through the ZOOM platform.
To get the access codes please contact the secretary office

Andrea Veronese

PhD Student in Mathematics

Portfolio optimization in presence of self-exciting processes: from theory to practice

Abstract:
We aim at generalizing the celebrated portfolio optimization problem "à la Merton", where the asset price evolution is steered by a self-exciting jump-diffusion process.
We first define the rigorous mathematical framework needed to introduce the stochastic optimal control problem we are interesting in.
Then, we provide a proof for a specific version of the Dynamic Programming Principle (DPP) with respect to the general class of self-exciting processes under study.
After, we state the Hamilton-Jacobi-Bellman (HJB) equation, whose solution gives the value function for the corresponding optimal control problem.
The resulting HJB equation takes the form of a Partial Integro Differential Equation (PIDE), for which we prove both existence and uniqueness for the solution in the viscosity sense.
We further derive a suitable numerical scheme to solve the HJB equation corresponding to the portfolio optimization problem.
To this end, we also provide a detailed study of solution dependence on the parameters of the problem.
The analysis is performed by calibrating the model on ENI asset levels during the COVID-19 worldwide breakout.
In particular, the calibration routine is based on a sophisticated Sequential Monte Carlo algorithm.

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CONTATTI
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