

# MAT4770 - oral exam Spring 2024

The **oral exam** is organised in 2 parts.

In the first 20 minutes we start from one of the following topics, randomly chosen by the examiners.

1. Temperature model based on CAR(p). Description of its properties. Connection with time series with detailed proof. Presentation of the procedure for the fitting of this model to data.
2. Electricity is a flow commodity. Detail the meaning of this and the impact that this “flowing” has in non-arbitrage pricing of derivatives in the electricity market. Case study of the pricing measure of a 2 factor arithmetic model for electricity spot price.
3. HJM approach to the modelling of forward prices for electricity futures. Conditions for no arbitrage and consistency in the case of futures over a delivery period. Theory and case study in models based on a geometric Brownian motion.
4. Electricity futures with different settlement format. Associated forward prices with formulae derived from spot prices. Case study in the case of a spot model given by a Brownian driven Ornstein-Uhlenbeck process.
5. Fourier approach for option pricing of electricity futures written on forward prices given by an exponential model with jumps. Case study of the European call.

It is expected an overall presentation filled in with the necessary definition and mathematical detail for the major results.

The second part is about 20 minutes long and consists of questions on the program. In this part both theory and exercises can be asked. The whole course program is material for examination, see the weekly reports provided at the webpage of the course under “Schedule”. No notes are admitted at the exam.