Поредната сбирка на семинара на секция

Математическо моделиране и числен анализ

ще се състои на 24.11.2025 г., понеделник, от 14:00 часа в зала 503
на Института по математика и информатика.

Доклад на тема

Modelling financial crisis propagation as an epidemic on multiplex networks

ще изнесе

д-р Малвина Божидарова (Russell Group Limited)

Резюме: We propose a novel framework for modelling the spread of financial crises in complex networks, combining financial data, Extreme Value Theory and an epidemiological transmission model. We accommodate two key aspects of contagion modelling: fundamentals-based contagion, where the transmission is due to direct financial linkages, and pure contagion, where a crisis might trigger additional crises due to global effects. We use stock price, geographical location and economic sector data for a set of companies to construct multiplex networks of four layers, on which a Susceptible-Infected-Recovered transmission model is defined, in order to model the spread of financial shocks between companies by accounting for their interconnected nature. By utilizing stock price data for the 2008 and 2020 financial crises, we investigate and assess the effectiveness of our model in forecasting the propagation of financial shocks through the network, where a shock is detected by measuring stock price volatility. The results suggest that the proposed framework is effective in predicting the spread of financial crises. Our findings demonstrate the significance of each layer of the multiplex network structure, which differentiates between various transmission pathways, for predicting the number of affected companies, as well as for company-, sector- or location-specific predictions.