Dear students,

This is to announce opportunity for all of you math enthusiasts to follow a series of lectures – all with a selected topic within applied mathematics.

Where? The room F2.26 has the nice facilities that all mathematicians appreciate 😊

Program

09.30 – 10.10  Inverse scattering: from formulation to application
Mirza Karamemhodovic, Department of Applied Mathematics and Computer Science, and Department of Physics, Technical University of Denmark

To introduce inverse scattering, I will show how a concrete nanostructure can be numerically reconstructed from real-world scatterometric data. I will describe in detail the formulation of a relevant forward model and the numerical optimization of the model parameters. I will discuss the so-called decomposition method from a mathematical viewpoint, and describe and address essential issues found in inverse problems in general.

10.20 – 11.00  Simulation of turbulent flows
Muhamed Hadžiabdić, Faculty of Engineering and Natural Sciences, ME Program, International University of Sarajevo

Turbulence is present everywhere around you, in cup of coffee, your blood stream, in the wind that destroy your hair style, in oceans, atmosphere, countless technological devices and household appliances and finally, turbulence plays the key role in formation of our galaxies and planets. It is almost universally accepted that the Navier–Stokes equations represent the physics of all fluid flows, including turbulent ones. These equations are nonlinear and difficult to solve. There are a few exact solutions, and all of these have been obtained at the expense of introducing simplifying, often physically unrealistic, assumptions. You will see how Navier–Stokes equations can be solved numerically. We will discuss computer power one needs for simulation of turbulent flows as well as the issue of modeling strategy for turbulent flows.

11.10 – 11.50  Brief presentation of Kalman Filtering Theory
Migdat Hodžić, Faculty of Engineering and Natural Sciences, EE Program, International University of Sarajevo

Some key applications in areas as GPS, Inertial Navigation, Aerospace, Economics, Healthcare, Object Tracking, Robotics, Image Processing, Control, Complex Systems, etc. Connection will be made with Stochastic Optimization, Orthogonal Projections, Least Square Method and Conditional Probability, embodied in famous Bayes Rule, with a funny Bosnian twist. Kalman Filter is considered one of the most used and successful algorithms of the 20th Century, with elegant mathematics, and ever growing number of effective applications.