

Bahçeşehir University, Istanbul, Türkiye
Analysis & PDE Center, Ghent University, Ghent, Belgium
Institute Mathematics & Math. Modeling, Almaty, Kazakhstan

“Analysis and Applied Mathematics”

Weekly Online Seminar

Seminar leaders:

Prof. Allaberen Ashyralyev (BAU, Istanbul),
Prof. Michael Ruzhansky (UGent, Ghent),
Prof. Makhmud Sadybekov (IMMM, Almaty)

Date: **Tuesday, December 5, 2023**

Time: 12.00-13.00 (Istanbul) = 10.00-11.00 (Ghent) = 15.00-16.00 (Almaty)

Zoom link: <https://us02web.zoom.us/j/6678270445?pwd=SFNmQUlVt0tRaH-IDaVYrN3I5bzJVQT09>, **Conference ID:** 667 827 0445, **Access code:** 1

Speaker:

Prof. Dr. Ozgur Yildirim

Yildiz Technical University, Istanbul, Türkiye

Title: On the asymptotic solutions and high order uniform difference schemes of perturbation problems for hyperbolic equations

Abstract: The abstract initial value perturbation problem

$$\varepsilon^2 u''(t) + Au(t) = f(t), 0 < t < T,$$

$$u(0) = \varphi, u'(0) = \psi$$

for hyperbolic equations is studied. The self adjoint positive definite operator A in a Hilbert space H is considered. An arbitrarily small parameter $\varepsilon \in (0, \infty)$ multiplying the highest derivative term is considered. An asymptotic solution to the problem is presented. The uniform high-order two-step difference schemes corresponding to this problem are obtained. This work covers the general perturbation theory of uniform difference schemes on hyperbolic partial differential equations. The theoretical results are verified by the numerical implementations using Matlab. The error results of the numerical experiments are also presented. This is a joint work with Prof. Dr. Allaberen Ashyralyev (BAU).

Biography:

Ozgur Yildirim was born in Artvin (Türkiye) in 1978. He received his degree in Mathematics and Doctor of Philosophy degree in Mathematics from Uludag University, Türkiye. His research interests include partial differential equations, stability of the solutions of difference schemes, numerical analysis. He is currently a professor at Department of Mathematics, Yildiz Technical University, Istanbul, Türkiye.