

Bahçeşehir University, Istanbul, Turkey  
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 (GU, Ghent),  
Prof. Makhmud Sadybekov (IMMM, Almaty)

Date: **Tuesday, January 11, 2022**

Time: 13.00-14.00 (GMT+4, Istanbul) = 10.00-11.00 (Ghent) = 15.00-16.00 (Almaty)

Zoom link: <https://us02web.zoom.us/j/6678270445?pwd=SFNmQUlVTOtRaH-IDAuVYrN3l5bzJVQT09>, **Conference ID:** 667 827 0445, **Access code:** 1

### Speaker:

**Prof. Dr. T.Sh. Kal'menov**

*Institute of Mathematics and Mathematical Modeling, Almaty, Kazakhstan*

Title: **Hadamard's example and solvability of the mixed Cauchy problem for the multidimensional Gellerstedt equation**

Abstract: In the theory of partial differential equations, an example constructed by J. Hadamard, which shows the instability of the solution of the Cauchy problem for the Laplace equation with respect to small changes in the initial data, is of great importance. In the works of A.N.Tikhonov, V.Y.Arsenin, M.M.Lavrentiev and many subsequent papers, this problem is reduced to integral equations of the first kind by solving the Newton potential, various regularizations of the problem under consideration are given and its conditional correctness is established. In our previous work, a criterion for the strong solvability of the Cauchy problem for the Laplace equation was found by the spectral decomposition of the Laplace operator with a deviating argument.

In this report, we consider a mixed Cauchy problem for two-dimensional and multidimensional degenerate Gellerstedt equations. Analogs of the Hadamard's example are constructed and incorrectness of the solution of the Cauchy problem for the Gellerstedt equation in two-dimensional and multidimensional cases is established. The condition of strong solvability of the mixed Cauchy problem for the multidimensional Gellerstedt equation in a cylindrical domain is found. The proof is based on the spectral properties of the Laplace operator and the properties of special functions.

## Biography:

Tynysbek Kal'menov is a graduate of the Novosibirsk State University (1969), and a representative of school of A.V. Bitsadze, the outstanding scientist, the corresponding member of the Academy of Sciences of the USSR. In 1972, he completed his postgraduate studies at the Institute of Mathematics of the Siberian Branch of the Academy of Sciences of the USSR. In 1983, he defended his doctoral thesis at Moscow State University. In 1989, he was elected as a corresponding member of the Academy of Sciences of the Kazakh SSR.

Tynysbek Kal'menov worked at the Institute of Mathematics and Mechanics of the Academy of Sciences of the Kazakh SSR (1972-1985). From 1986 to 1991, he was the dean of the Faculty of Mathematics of Al-Farabi Kazakh State University. From 1991 to 1997, he was the rector of Kazakh Chemical-Technological University (Shymkent).

From 2004 to 2019, Tynysbek Kal'menov was the General Director of the Institute of Mathematics and Mathematical Modeling, he made it one of the leading scientific centers in the country and the best research institute in Kazakhstan. Suffice it to say, that in terms of the number of scientific publications (2015-2018) in international rating journals indexed in the Web of Science, the Institute of Mathematics and Mathematical Modeling ranked fourth among all Kazakhstani organizations, behind only three large universities: Nazarbaev University, N Al-Farabi ational University and L.N. Gumilyov Eurasian University.

Since 2019, Tynysbek Kal'menov has been working as the head of the Department of Differential Equations of the Institute of Mathematics and Mathematical Modeling.

In 2013, he was awarded the State Prize of the Republic of Kazakhstan in the field of science and technology for the series of works "To the theory of initial-boundary value problems for differential equations".

The main areas of scientific interests of Academician Tynysbek Kal'menov are differential equations, mathematical physics and operator theory. He has obtained fundamental scientific results, many of which led to the creation of new scientific directions in mathematics.

Tynysbek Kal'menov has trained 11 doctors and more than 60 candidate of sciences and PhD, has founded a large scientific school on equations of mixed type and differential operators recognized all over the world. Many of his disciples are major independent scientists recognized in the world of mathematics.

He has published over 150 scientific articles, most of which are published in international mathematical journals, including 14 articles published in "Doklady AN SSSR/ Doklady Mathematics". In the last 5 years alone (2016-2020), he has published more than 30 articles in scientific journals indexed in the Web of Science database. To date, Academician Tynysbek Kal'menov has a Hirsch index of 18 in the Web of Science and Scopus databases, which is the highest indicator among all Kazakhstan mathematicians.