WORKSHOP ON SPECIAL FUNCTIONS

Special functions appear naturally in many problems of applied mathematics and engineering sciences. Motivated by the applications the analytical properties of the special functions have been studied frequently by many researchers. The main objective of this workshop is to present some results related to special functions. The topics include classical special functions going back to Bessel, inequalities, asymptotic analysis, the role of special functions in complex analysis and sampling theory. The workshop will take place on September 8, 2015 at Department of Mathematics, Babeş-Bolyai University, Cluj-Napoca, Romania. During this workshop the following talks will be delivered:

- ÁRPÁD BARICZ[1]: **Zeros of Bessel functions and their derivatives**
  Abstract: The zeros of Bessel functions and their derivatives play an important role in mathematical physics, and other areas of natural sciences. In this talk our aim is to offer a detailed overview of the results concerning the real zeros of the Bessel functions of the first kind and their derivatives. Some open problems and conjectures will be also presented.

- DRAGANA JANKOV MAŠIREVIĆ[2]: **On new summations of Schlömilch series containing modified Bessel function of the second kind terms**
  Abstract: Certain closed expressions for the Schlömilch series which members contain modified Bessel functions of the second kind K_ν are derived. Also, closed expressions for the Schlömilch series with members containing products of K_ν and modified Bessel function of the first kind I_ν are derived as a by-product of these results.

- TIBOR K. POGÁNY[3]: **Whittaker-type sampling of stochastic signals**
  Abstract: Mean square and almost sure Whittaker–type derivative sampling theorems are obtained for the class $L^\alpha(\Omega, \mathfrak{F}, \mathsf{P})$; $0 \le \alpha \le 2$ of stochastic processes having spectral representation, with the aid of the Weierstraß σ function. Functions of this class are represented by interpolatory series. The results are valid for harmonizable and stationary processes ($\alpha = 2$) as well. The formulæ are interpreted in the α–mean sense and also in the almost sure P sense when the initial signal function and its derivatives (up to some fixed order) are sampled at the points of the integer lattice $\mathbb{Z}^2$. The *circular truncation error* is introduced and used in the truncation error analysis. Finally, sampling sum convergence rate is provided.

- SAMINATHAN PONNUSAMY[4]: **Role of special functions in function theory, function spaces, and inequalities**
  Abstract: The talk will focus on the importance of Guassian and Confluent hypergeometric functions in function theoretic point of view, in particular. Inequalities such as Turán type, associated with certain special functions will be discussed.

- SANJEEV SINGH[5]: **Modified Dini functions: monotonicity patterns and functional inequalities**
  Abstract: In this talk our aim is to present some new functional inequalities, like Turán type inequalities, Redheffer type inequalities, and a Mittag-Leffler expansion for a special combination of modified Bessel functions of the first kind, called the modified Dini functions. Moreover, we show the complete monotonicity of a quotient of modified Dini functions by involving a new continuous infinitely divisible probability distribution. The key tool in our proofs is a recently developed infinite product representation for a special combination of Bessel functions of the first kind, which was very useful in determining the radius of convexity of some normalized Bessel functions of the first kind.

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