

THE CATHOLIC UNIVERSITY OF AMERICA
Washington, DC 20064

SEMINAR IN FUNCTIONAL ANALYSIS
AND RELATED AREAS

Wednesday, November 9, 2022

4:45 p.m. - 6:30 p.m.

SPEAKER: Professor Hosam Mahmoud
The George Washington University

TITLE: Egorychev's Method: A hidden treasure

ABSTRACT: Egorychev method is a potent technique for reducing combinatorial sums. In spite of the effectiveness of the method, it is not well known or widely disseminated. Our purpose in this seminar is to bring light to this method.

The chief idea in Egorychev method is to reduce a combinatorial sum by recognizing some factors in it as coefficients in a formal power series (possibly in the form of contour integrals), then identifying parts that can be summed in closed form. Once the summation is gone, the rest can be evaluated via one of several techniques, which are namely:

(I) Direct extraction of coefficients, after an inspection telling us it is the generating function (formal power series) of a known sequence,

(II) Applying residue operators, (III) Appealing to Cauchy's residue theorem, when the coefficients alluded to appear as contour integrals.

We present some background from the theory of complex variables and illustrate each technique with some examples.

This is a joint work with Marko Riedel, Stuttgart University, Germany. The work is the culmination of effort by Marko Riedel over many years. His contributions in forums like math.stackexchange made a difference in that community and his many contributions sharpened the method.

PLACE: Aquinas Hall, room 108. The talk will be on Zoom as well (from 4:45 p.m. to 6:30 p.m. ET). The corresponding link will be sent to everyone in advance.

ORGANIZERS: V. Bogdan (The Catholic University of America), P. Kainen (Georgetown University), R. Kalpathy (The Catholic University of America), and A. Levin (The Catholic University of America).

Tel: [202-319-5221](tel:202-319-5221), [202-319-5222](tel:202-319-5222). Fax: [202-319-5231](tel:202-319-5231). E-mail: levin@cua.edu

Web page:

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