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# APPLICATIONS AND EXTENSIONS OF REAL STABILITY PRESERVERS

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## Abstract

Linear operators on polynomials which preserve the property of having only real roots have been studied since the seminal work of Polya and Schur in the early 20th century. Various progress has been made in the direction of this problem, culminating in 2009 in the Borcea-Branden characterization of all such real-rootedness preservers. Their result relies on a multivariate generalization of real-rootedness called "real stability", a concept which has recently had a strong influence on fields including combinatorics, optimization, and theoretical computer science. In all applications, the Borcea-Branden characterization has become an essential and heavily-utilized tool. In this talk, we will discuss this characterization, and a number of its most interesting theoretical consequences. We will further discuss a few combinatorial implications of the theory, particularly related to matchings of a graph. If time permits, we will also discuss the relation of this theory to that of "mesh polynomials", which are real-rooted polynomials with a certain minimum spacing between consecutive roots.

**Date :** Friday, June 8, 2018

**Time:** 14:00

**Place:** IMBM Seminar Room, Boğaziçi University South Campus