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David G. Wagner* (dgwagner@math.uwaterloo.ca), C&O Department, University of Waterloo, Waterloo, ON N2M 4S7, Canada. *Multivariate stable polynomials: theory and applications.*

Univariate polynomials with only real roots – while special – do occur frequently enough that their properties can lead to interesting conclusions in diverse areas. Due largely to the work of two young mathematicians, Julius Borcea and Petter Brändén, a very successful multivariate generalization of this method has recently been developed. The first part of this paper surveys some of the main results of this theory of “multivariate stable” polynomials – the most central of these results is the characterization of linear transformations preserving stability. The second part of the paper presents various applications of the theory in complex analysis, statistical mechanics, probability, combinatorics, and matrix theory. (Received September 23, 2009)