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Joseph Kung, Xinyu Sun and Catherine Yan* (cyan@math.tamu.edu), Department of Mathematics, Texas A&M University, MS STOP 3368, College Station, TX 77843-3368.

Goncarov-Type Polynomials and Applications in Combinatorics.

In this paper we use the theory of sequences of polynomials biorthogonal to a sequence of linear operators to study combinatorial problems. In particular, we described the algebraic properties of the sequence of Goncarov polynomials and its various generalizations, which give a unified algebraic approach to several combinatorial objects, including (1) The cumulative distribution functions of the random vectors of order statistics of n independent random variables with uniform distribution on an interval; (2) general parking functions, that is, sequences (x_1, x_2, \dots, x_n) of integers whose order statistics are bounded between two given non-decreasing sequences; (3) Lattice paths that avoid certain general boundaries; and (4) The area-enumerator of lattice paths avoiding certain general boundaries. (Received January 12, 2011)