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1003-33-821 Shi-shyr Roan* (maroan@gate.sinica.edu.tw), Institute of Mathematics, Academia Sinica, Taipei, Taiwan. Structure of Certain Chebyshev-type Polynomials in Onsager's Algebra Representation. Preliminary report.

In this report, we present a systematical account of mathematical structures of certain special polynomials arisen from the energy consideration of the superintegrable N-state chiral Potts model with a finite number of sizes. The polynomials of low-lying sectors are represented in two different forms, one of which is directly related to the energy description of superintegrable chiral Potts Z_N -spin chain via the theory of Onsager's algebra representation. The polynomials for both two forms satisfy the (N + 1)-term recursion relations, and Nth order differential equations; one type of polynomials reveals certain Chebyshev-like property. Here we provide a rigorous mathematical argument for cases N = 2, 3, and further raise some mathematical conjectures on those special polynomials for a general N. (Received September 29, 2004)