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A Catalan array and gamma-numbers

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Gamma-numbers are the coefficients arising in the expansion of a polynomial in terms of a particular basis. If a polynomial is palindromic (symmetric), some of these numbers are necessarily zero, whereas the others may be positive, negative, or zero. Gamma-numbers are especially interesting when they are positive, since positivity implies that the polynomial is palindromic and unimodal. In addition, gamma-numbers may count interesting combinatorial objects. The Eulerian polynomials and the Narayana polynomials are examples of well-known polynomials that have positive gamma-numbers. In this talk I will present a general formula to compute the gamma-numbers of any palindromic polynomial. This new formula involves a Catalan array that is familiar in the theory of Riordan arrays. Conditions for gamma-positivity will also be discussed.