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Patterns in Rosary Permutations

Given a string Y = (Y[1], Y[2], Y[3], ..., Y[n]), we define its δ'-transformation as the difference string δ'Y = (Y[2]-Y[1], Y[3]-Y[2], ..., Y[n]-Y[n-1], Y[1]-Y[n]). We analyzed the distribution of the δ'-transformation applied to rosary permutations and we found recursive formulas and other results that help in understanding patterns in rosary permutations. Some formulas were connected with results for other sets of permutations.