1176-05-60   **Nathan Sun*** (`nsun@college.harvard.edu`), 95 Dunster Street, 459 Kirkland Mail Center, Cambridge, MA 02138. *On Permutation Weights and q-Eulerian Polynomials.*

Weights of permutations were originally introduced by Dugan, Glennon, Gunnells, and Steingrímsson in their study of the combinatorics of tiered trees. Given a permutation σ viewed as a sequence of integers, computing the weight of σ involves recursively counting descents of certain subpermutations of σ. Using this weight function, one can define a q-analog $E_n(x, q)$ of the Eulerian polynomials. We prove two main results regarding weights of permutations and the polynomials $E_n(x, q)$. First, we show that the coefficients of $E_n(x, q)$ stabilize as n goes to infinity, which was conjectured by Dugan, Glennon, Gunnells, and Steingrímsson, and enables the definition of the formal power series $W_d(t)$, which has interesting combinatorial properties. Second, we derive a recurrence relation for $E_n(x, q)$, similar to the known recurrence for the classical Eulerian polynomials $A_n(x)$. Finally, we give a recursive formula for the numbers of certain integer partitions and, from this, conjecture a recursive formula for the stabilized coefficients mentioned above. (Received January 11, 2022)