Yuval Roichman and Michelle Wachs* (wachs@math.miami.edu). On $r$-inversions and symmetric functions. Preliminary report.

The $r$-inversion number is a statistic on words of length $n$ (over the positive integers), which interpolates between the descent number ($r = 2$) and the inversion number ($r = n$). We consider a symmetric function $U_{n,r}$ that enumerates words of length $n$ by this statistic. The symmetric function $U_{n,r}$ is an example of an LLT polynomial. The LLT polynomials were shown to be Schur-positive by Grojnowski and Haiman by means of Kazhdan-Lusztig theory. It is an open question to give a combinatorial description of the coefficients in the Schur basis expansion. For $r = 2$ and $r = n$, such descriptions are well known. For $r = 3$, a description (in a more general setting) was conjectured by Haglund and was proved by Blasiak using noncommutative Schur functions and Lam’s algebra of ribbon Schur operators. Here we give a more elementary proof for the $r = 3$ case, which uses classical RSK theory, and we give some consequences. (Received September 26, 2017)