Norman Bradley Fox* (norman.fox@uky.edu) and Richard Ehrenborg. The Descent Set Polynomial Revisited.

The descent set polynomial $Q_n(t)$, first introduced by Chebikin, Ehrenborg, Pylyavskyy and Readdy, was found to have many factors that are cyclotomic polynomials. The most common factor, $\Phi_2 = t + 1$, exists if the proportion of odd descent set statistics is $1/2$, which occurs if the binary expansion of $n$ has two or three 1’s. We continue their work of explaining cyclotomic factors, focusing on a large class of factors of the form $\Phi_{2p}$ where $p$ is a prime. We additionally show that if $\Phi_2$ is a factor of $Q_{2n}(t)$ then it is a double factor. Finally, we give conditions for an odd prime power $q = p^r$ for which $\Phi_{2p}^2$ is a double factor of $Q_{2q}(t)$ and of $Q_{q+1}(t)$. (Received September 08, 2014)