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**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  $\Phi_{2^p}$  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  $\Phi_{2^p}^2$  is a double factor of  $Q_{2q}(t)$  and of  $Q_{q+1}(t)$ . (Received September 08, 2014)