

1125-11-531 **Ira M Gessel*** (gessel@brandeis.edu). *Exponential generating function mod p* . Preliminary report.

We find congruences to a prime modulus p for sequences defined by exponential generating functions by studying the ring of exponential generating functions modulo p . The algebraic structure of this ring is quite simple, but most of our results follow from properties, such as chain rules, for the derivations D^{p^i} where D is the derivative.

We find that many sequences defined by exponential generating functions are periodic modulo p , and in fact the set of such sequences is closed under addition, multiplication, composition, and compositional inversion of their exponential generating functions. We also find that solutions of functional equations such as $f(x) = x + f(e^x - x - 1)$ and $2g(x) = x + g(e^x - 1)$ have coefficient sequences that are not periodic modulo p . (Received September 05, 2016)