1014-05-156 **Pallavi Jayawant*** (pjayawan@bates.edu) and **Ira Gessel** (gessel@brandeis.edu). *A triple lacunary generating function for Hermite polynomials.*

Some of the classical orthogonal polynomials such as Hermite, Laguerre, Charlier, etc. have been shown to be the generating polynomials for certain combinatorial objects. These combinatorial interpretations are used to prove new identities and generating functions involving these polynomials. We apply Foata's approach to generating functions for the Hermite polynomials to obtain a triple lacunary generating function. We define renormalized Hermite polynomials $h_n(u)$ by

$$\sum_{n=0}^{\infty} h_n(u)\frac{z^n}{n!} = e^{uz+z^2/2},$$

and give a combinatorial proof of the following generating function:

$$\sum_{n=0}^{\infty} h_{3n}(u)\frac{z^n}{n!} = \frac{e^{(w-u)(3u-w)/6}}{\sqrt{1-6wz}} \sum_{n=0}^{\infty} \frac{(6n)!}{2^{3n}(3n)!(1-6wz)^{3n}}\frac{z^{2n}}{(2n)!},$$

where $w = (1-\sqrt{1-12uz})/6z = uC(3uz)$ and $C(x) = (1-\sqrt{1-4x})/(2x)$ is the Catalan generating function. (Received August 03, 2005)