

# Explicit formulae for all higher-order lacunary generating functions of the two-variable Hermite polynomials

Nicolas Behr

IRIF, Université Paris Diderot (Paris 07), France  
nicolas.behr@irif.fr

18 WORKSHOP, BĘDLEWO 2018

## Abstract

Reporting on recent joint work [1] with G.H.E. Duchamp (Paris 13) and K.A. Penson (Paris 06), for a sequence  $P = (p_n(x))_{n=0}^{\infty}$  of polynomials  $p_n(x)$ , we study the  $K$ -tuple and  $L$ -shifted lacunary generating functions  $\mathcal{G}_{K,L}(\lambda; x) := \sum_{n=0}^{\infty} \frac{\lambda^n}{n!} p_{n \cdot K + L}(x)$ , for  $K = 1, 2, \dots$  and  $L = 0, 1, 2, \dots$ . We establish an algorithm for efficiently computing  $\mathcal{G}_{K,L}(\lambda; x)$  for generic polynomial sequences  $P$ . This procedure is exemplified by application to the study of Hermite polynomials, whereby we obtain closed-form expressions for  $\mathcal{G}_{K,L}(\lambda; x)$  for arbitrary  $K$  and  $L$ , in the form of certain infinite series involving generalized hypergeometric functions. Our technique reproduces all the results previously known in the literature.

- [1] Behr, N., Duchamp, G. H., and Penson, K. (2018). Explicit formulae for all higher order lacunary generating functions of Hermite polynomials (in preparation).