

II Joint Conference of the Belgian, Royal Spanish and Luxembourg Mathematical Societies
Logroño, June 6–8, 2016

Production matrices for geometric graphs

Clemens Huemer¹, Carlos Seara¹, Rodrigo I. Silveira¹, Alexander Pilz²

We present production matrices for non-crossing geometric graphs on point sets in convex position, which allow us to derive formulas for the numbers of such graphs. Several known identities for Catalan numbers, Ballot numbers, and Fibonacci numbers arise in a natural way, and also new formulas are obtained, such as a formula for the number of non-crossing geometric graphs with root vertex of given degree. The characteristic polynomials of some of these production matrices are also presented. The proofs make use of generating trees and Riordan arrays.

¹Departament de Matemàtiques, Universitat Politècnica de Catalunya, Spain
{clemens.huemer, carlos.seara, rodrigo.silveira}@upc.edu

²Department of Computer Science, ETH Zürich, Switzerland
alexander.pilz@inf.ethz.ch