Some Results on the Bivariate Laguerre Polynomials $L^{(\alpha,\beta,\gamma,\eta,\xi)}_{n,m}(x,y)$

Mehmet Ali Özarslan (1) and Cemaliye Kürt (2)

(1) Eastern Mediterranean University, Famagusta, North Cyprus, mehmetali.ozarslan@emu.edu.tr
(2) Eastern Mediterranean University, Famagusta, North Cyprus, cemaliye.kurt@emu.edu.tr

Abstract

In this paper, we consider the general classes of bivariate Laguerre polynomials (see [1])

$$L^{(\alpha,\beta,\gamma,\eta,\xi)}_{n,m}(x,y) = \frac{\Gamma(\alpha n + \beta m + \gamma + 1)}{\Gamma(n + \eta m)} \sum_{k_1=0}^{n} \sum_{k_2=0}^{m} \frac{(-n)_{k_1}(-m)_{k_2}x^{\alpha k_1}y^{\beta k_2}}{\Gamma(\alpha k_1 + \beta k_2 + \gamma + 1)\Gamma(\eta k_2 + \xi)k_1!k_2!}$$

where $\alpha, \beta, \gamma, \eta, \xi \in \mathbb{C}$, $\text{Re}(\alpha), \text{Re}(\beta), \text{Re}(\eta), \text{Re}(\xi) > 0$, $\text{Re}(\gamma) > -1$. We first obtain linear, multilinear and mixed multilateral generating function for the above mentioned classes. We further derive a finite summation formula and a series relation for the bivariate Laguerre polynomials $L^{(\alpha,\beta,\gamma,\eta,\xi)}_{n,m}(x,y)$.

Keywords: Laguerre polynomials, generating function.

References