On a moment generalization of some classical second-order differential equations generating classical orthogonal polynomials

Víctor Soto-Larrosa, Edmundo J. Huertas, Alberto Lastra

Departamento de Física y Matemáticas, Universidad de Alcalá

v.soto@uah.es

Abstract: The aim of this work is to construct new polynomial systems, which are solutions to certain functional equations which generalize the second-order differential equations satisfied by the classical orthogonal polynomial families. These functional equations can be chosen to be of different type: fractional differential equations, q-difference equations, etc, which converge to the ordinary differential equations of the aforesaid classical orthogonal polynomials in each case.

Acknowledgments: The work of V. Soto-Larrosa has been supported by Consejería de Economía, Hacienda y Empleo of the Comunidad de Madrid through "Programa Investigo", funded by the European Union "NextGenerationEU".
The authors are members of the research group AnFAO (Cod.: CT-CE2023/876) of Universidad de Alcalá.