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A generic polynomial solution for the differential equation of hypergeometric type and six sequences of orthogonal polynomials related to it. (English)

The authors present a generic formula for the polynomial solution families of the well-known differential equation of hypergeometric type

$$\sigma(x)y_n''(x) + z(x)y_n'(x) - \lambda_n y_n(x) = 0$$

and show that all the three classical orthogonal polynomial families as well as three finite orthogonal polynomial families, extracted from this equation, can be identified as special cases of this derived polynomial sequence. Some general properties of this sequence are also given.

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Keywords : classical orthogonal polynomials; differential equation of hypergeometric type; weight function; hypergeometric functions; hypergeometric identities; recurrence equations

Classification :

   *33C45 Orthogonal polynomials and functions of hypergeometric type
   33C20 Generalized hypergeometric series
   33F10 Symbolic computation of special functions