A Computational Algebraic Approach for the Study of Polynomial Sequences. Examples and Applications

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Abstract:

In this work, we aim to outline a path for studying polynomial sequences using a computational algebraic approach. We consider the particular case of Appell polynomials. A key application of this approach is umbral interpolation, where a linear functional and a operator are used to construct interpolating polynomials. By applying umbral interpolation, we derive ecient numerical integration methods. Finally, we address the umbral dierential problem: we obtain methods for the numerical solution of higher order non linear ordinary dierential equations associated with general umbral interpolating conditions.