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Weighted Sums of Squares via Generalized Eulerian Polynomials,
Fibonacci Quart. **55** (2017), no. 5, 149–165.

Abstract

We give explicit formulas for the weighted sum of squares $\sum_{j=0}^{m-1} z^j (aj + b)^2$, where $a, b \in \mathbb{C}$ are given, and $z \in \mathbb{C}$, $z \neq 0, 1$ is the weight. In the case $a, b \in \mathbb{Z}$ and $z \in \mathbb{Q}$, we show that there is a one-to-one correspondence between our weighted sums and Primitive Pythagorean Triples. The main tools we use are the Z -transform of sequences and a generalization of Eulerian polynomials.