

SOLUTIONS OF CERTAIN POLYNOMIAL DIOPHANTINE EQUATIONS

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ABSTRACT. For each integer $n \geq 1$, we consider the unique polynomials $P, Q \in \mathbb{Q}[x]$ of smallest degree n that are solutions of the equation $P(x)x^{n+1} + Q(x)(x+1)^{n+1} = 1$. We derive numerous properties of these polynomials, including explicit expansions, differential equations, recurrence relations, generating functions, discriminants, irreducibility results, and their zero distribution. We also consider some related polynomials and their properties. (This is joint work with Maciej Las.)