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Polynomial representation of functions on the integers modulo n

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Abstract. We define a polynomial index PI for any finite commutative ring with unity element. This index provides a measure of the distance the ring is from being a finite field (whose PI is 1). After proving a multiplicativity property for the ring Z_n, we focus on the case of Z_{p^m} (p a prime). We determine the index for this ring using the concepts of annihilator polynomials and stopping point degrees. Finally, we give a specific formula for $PI(Z_{p^m})$ in terms of p and m only, provided that $m \leq p$.

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