FRI/EPCOS
16:00–16:20

Divisibility properties of certain polynomials by Schur's method

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In 1929 I. Schur [4] used p-adic arguments extending the Eisenstein Irreducibility Criterion to prove new irreducibility results for certain families of polynomials. A new method based on Schur's ideas was introduced by R.F. Coleman and M. Filaseta. We mention the important result of Filaseta [1] concerning the irreducibility of the Bessel polynomials that are of importance not only in mathematics but also in physics. The method reduces the algebraic question to the question of finding large primes in products of consecutive integers, which then can be handled by using number theoretic results. In my talk I will survey some of the existing results and then discuss new contributions that are joint work with T.N. Shorey (cf. [2,3]). We give an effective upper bound for the degrees of divisors (over $\mathbb{Q}$) of generalized Laguerre polynomials

$$L_n^{(\alpha)}(x) = \sum_{j=0}^{n} \binom{n+\alpha}{n-j} \frac{(-x)^j}{j!}$$

for a fairly broad range of α and for even more general polynomials of hypergeometric type.

[1] M. FILASETA: The irreducibility of all but finitely many Bessel polynomials. *Acta Math.* **174** (1995), 383-397.

[2] C. FUCHS AND T.N. SHOREY: Divisibility properties of generalized Laguerre polynomials. Preprint, 2008.

[3] C. FUCHS AND T.N. SHOREY: Divisibility properties of hypergeometric polynomials. In Preparation.

[4] I. SCHUR: Einige Sätze über Primzahlen mit Anwendungen auf Irreduzibilitätsfragen, I. *Sitzungsber. Preuss. Akad. Wiss. Berlin. Phys.-Math. Kl.* **14** (1929), 125-136.