Seminar Announcement*

Speaker: J.K. Langley
(University of Nottingham)

Analytic functions mapping integers to integers

A classical theorem of Pólya states that 2^z is the slowest growing transcendental entire function which takes integer values on the set $\mathbb{N}_0$ of non-negative integers. This result has seen subsequent generalisation by many authors, including to: determination of entire functions of somewhat larger growth which map $\mathbb{N}_0$ into $\mathbb{Z}$; entire functions mapping subsets of N_0 into $\mathbb{Z}$; entire functions mapping Gaussian integers $m+in$ into $\mathbb{Z}$; pairs of entire functions f and g such that f grows not much faster than g and $f(z) \in \mathbb{Z}$ whenever $g(z) \in \mathbb{N}_0$.

It turns out that for certain applications it is useful to consider functions analytic on the closed right half-plane ***H*** = *{z : Re z ≥ 0}* which map N_0 into Z. Such results have been applied in several contexts, for example to the problem of determinating a meromorphic function f from the set of zeros and poles of f and its derivatives.

A result of Pólya has an exact analogue for the half-plane: if f is analytic on ***H*** and maps $\mathbb{N}_0$ into $\mathbb{Z}$, and if f grows at most like a polynomial times 2^z, then in fact $f(z) = P(z)2^z + Q(z)$ where P and Q $m+in$ are polynomials. By adapting a method of Waldschmidt the speaker and A. Fletcher proved that if f is analytic of zero exponential type in ***H*** and takes integer values on a subset of $\mathbb{N}_0$ of positive lower linear density then f is in fact a polynomial. This result was subsequently applied to zero-sequences of solutions of differential equations by Fletcher, who also proved an analogous result for functions on ***H*** mapping subsets of the Gaussian integers into $\mathbb{Z}$.

DATE: June 08, 2009

TIME: 15:45

PLACE: FEF 403 (Seminar Room)

All interested people are cordially invited. After the seminar, some cookies and soft drinks will be served.

*This organization is supported by TUBİTAK