

MATHEMATICS RESEARCH SEMINAR

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THE PROOF OF DIRICHLET'S THEOREM

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ABSTRACT: Dirichlet's theorem states that there are infinitely many primes in an arithmetic progression if the gcd of its terms is 1. It is a simple statement, but it can be somewhat tantalizing as one tries to prove it. Introduced in this talk is a proof of this theorem for the case of prime modulus but the proof of this special case illustrates the main idea of the full proof very well. The idea of this proof is the backbone of techniques in analytic number theory, which laid the foundation for the proof of the prime number theorem and the theory of the Riemann-zeta function. Acquaintance with the basic theory of complex analytic functions will help us to follow the proof, but is not required.