

Algebra & Number Theory Seminar

Integer Matrix Exact Covering Systems and Product Identities for Theta Functions

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Abstract: In this talk, we show that many product identities for theta functions correspond to integer matrix exact covering systems. We can show that if \mathbb{Z}^n can be taken as the disjoint union of a lattice generated by n linearly independent vectors in \mathbb{Z}^n and a finite number of its translates, certain products of theta functions can be written as linear combinations of other products of theta functions. Our main theorem for products of two theta functions is a generalization of the Schröter formula. Many known identities for products of two theta functions are shown to be special cases of our main theorem. Several entries in Ramanujan's notebooks as well as new identities are proved as applications, including several new theorems for products of three and four theta functions that have not been obtained by other methods.