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Analogues of the Binomial Coefficient Theorems of Gauss and Jacobi

Two of the more well known congruences for binomial coefficients modulo p , due to Gauss and Jacobi, are related to the representation of an odd prime (or an integer multiple of the odd prime) p as a sum of two squares (or an integer linear combination of two squares). These two congruences, along with many others, have been extended to analogues modulo p^2 and are well documented in the literature. More recently, J. Cosgrave and K. Dilcher have extended the congruences of Gauss, Jacobi, and a related one due to Hudson and Williams to their analogues modulo higher powers of p . We will have a look at the methods used by Cosgrave and Dilcher and discuss their application to obtaining more congruences for binomial coefficients.