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Joseph P Kung* (kung@unt.edu), Department of Mathematics, 1155 Union Circle Box 311430, Denton, TX 76203-5017. *The chromatic and Tutte polynomial as a resultant force.*

A flow over a matrix G with columns indexed by E is a row vector in the row space of G , considered as a function on E . We will work with matrices over a finite field of order q . A parcel is a subset of pairs (f, g) of functions defined on E such that $f - g$ is a flow, satisfying a congruence condition (that an algebraic or combinatorial function of f and g satisfies some congruence condition). We will discuss several theorems of the form: a linear combination of sizes of parcels, with coefficients roots of unity, equals a simple multiple of an evaluation of the Tutte polynomial of the matroid on E defined by linear dependence of the columns of G at a point (u, v) , where $(u - 1)(v - 1) = q$. One of the theorems will give an interpretation of the evaluation of the chromatic polynomial of a graph at a prime power q as a “resultant force.” (Received November 01, 2012)