Michael P. Knapp* (mpknapp@loyola.edu), Mathematical Sciences Department, Loyola College, 4501 N. Charles Street, Baltimore, MD 21210-2699. Homogeneous additive equations in finite fields.

In 1966, H. Davenport and D. Lewis proved that if $k$ is a positive integer and $p$ is a prime not dividing $k$, then the system of additive homogeneous congruences

\[ a_1 x_1^k + \cdots + a_s x_s^k \equiv 0 \pmod{p} \]
\[ b_1 x_1^k + \cdots + b_s x_s^k \equiv 0 \pmod{p} \]

has a nonsingular solution whenever $s \geq 2k + 1$ and any nontrivial linear combination of the forms is explicit in at least $k + 1$ variables. In this talk, we extend this result to general finite fields. (Received September 27, 2005)