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Dickson polynomials

Dickson polynomials, which are close relatives of the Chebyshev polynomials, are defined by the recursion $D_0(x) = 2$, $D_1(x) = x$, and $D_{k+1}(x) = xD_k(x) - D_{k-1}(x)$. The American mathematician Leonard Eugene Dickson proved in his PhD thesis (1896) that $D_k(x)$ is a permutation polynomial on the field with p^n elements if and only if GCD$(k, p^{2n} - 1) = 1$. Since then, there have been many theorems about the values taken by Dickson polynomials over finite fields. We obtain new results following this theme, including some surprising connections with elementary number theory. This talk assumes only a background in finite fields.