The Irreducibility of Weighted Sums of Polynomials with Cyclotomic Irreducible Factors

For any positive integer n, we define the polynomial

$$\gamma_n(x) = 1 + x + x^2 + \cdots + x^n.$$

For any integer $k \geq 2$, let $S = \{n_1, n_2, \ldots, n_k\}$ be a set of integers with $0 < n_1 < \cdots < n_k$. Now we define the polynomial

$$\Gamma_{w(S)}(x) = \epsilon_1 x^{w_1} \gamma_{n_1}(x) + \cdots + \epsilon_k x^{w_k} \gamma_{n_k}(x),$$

where each $\epsilon_i = \pm 1$ and each w_i is a nonnegative integer. In this talk we discuss the irreducibility of the polynomials $\Gamma_{w(S)}(x)$ under certain restrictions. This is joint work with Lenny Jones.