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Lenny Jones* (lkjone@ship.edu), Department of Mathematics, Shippensburg University,
Shippensburg, PA 17257. *Polynomial Cunningham Chains.*

A sequence of prime numbers p_1, p_2, p_3, \dots , such that $p_i = 2p_{i-1} + 1$ for all i , is called a *Cunningham chain*. If k is the smallest positive integer such that $2p_k + 1$ is composite, then we say the chain has length k . It is conjectured that there are infinitely many Cunningham chains of length k for every positive integer k . A sequence of polynomials $f_1(x), f_2(x), \dots$ in $\mathbb{Z}[x]$, such that $f_1(x)$ has positive leading coefficient, each $f_i(x)$ is irreducible in $\mathbb{Q}[x]$, and $f_i(x) = x f_{i-1}(x) + 1$ for all i , is defined to be a *polynomial Cunningham chain*. If k is the least positive integer such that $x f_k(x) + 1$ is reducible in $\mathbb{Q}[x]$, then we say the chain has length k . We prove that there are infinitely many polynomial Cunningham chains of length k for every positive integer k , and that there are infinitely many polynomial Cunningham chains of infinite length. (Received September 21, 2011)