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# PANCYCLICITY WHEN EACH CYCLE CONTAINS $k$ CHORDS

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**Abstract**

For integers $n \geq k \geq 2$, let $c(n,k)$ be the minimum number of chords that must be added to a cycle of length $n$ so that the resulting graph has the property that for every $l \in \{k, k+1, \ldots, n\}$, there is a cycle of length $l$ that contains exactly $k$ of the added chords. Affif Chaouche, Rutherford, and Whitty introduced the function $c(n,k)$. They showed that for every integer $k \geq 2$, $c(n,k) \geq \Omega_k(n^{1/k})$ and they asked if $n^{1/k}$ gives the correct order of magnitude of $c(n,k)$ for $k \geq 2$. Our main theorem answers this question as we prove that for every integer $k \geq 2$, and for sufficiently large $n$, $c(n,k) \leq k\lceil n^{1/k}\rceil + k^2$. This upper bound, together with the lower bound of Affif Chaouche *et al.*, shows that the order of magnitude of $c(n,k)$ is $n^{1/k}$.

**Keywords:** pancyclicity, chords.

**2010 Mathematics Subject Classification:** 05D99, 11B75.

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