1116-05-1003 **Peter Danziger*** (danziger@ryerson.ca), Ryerson University, Toronto, Ontario , Canada. *On the Hamilton-Waterloo Problem.*

Given non-negative integers v, m, n, α, β, the Hamilton-Waterloo problem, asks for a factorization of the complete graph, K_v, into α m-cycle factors and β n-cycle factors. Clearly, $n, m \geq 3$ must be odd, and $m \mid v$, $n \mid v$ and $\alpha + \beta = (v-1)/2$ are necessary conditions. Without loss of generality, we may assume that $n \geq m \geq 3$.

We show that these necessary conditions are sufficient when v is a multiple of nm and $v > mn$, except possibly when $\beta = 1$ or 3, or $(m, n, \beta) = (3, 11, 5)$ or $(3, 13, 5)$. For the case where $v = mn$ we show sufficiency when $\beta > (n+5)/2$, except possibly when $\alpha = 2, 4$, or $(m, n, \alpha, \beta) = (3, 11, 6, 10)$, $(3, 13, 8, 10)$, $(3, 17, 10, 15)$ or $(3, 21, 10, 21)$.

We also show that when $n \geq m \geq 3$ are odd integers, the lexicographic product of C_m with the empty graph of order n has a factorization into α C_m factors and β C_n factors for every $0 \leq \alpha \leq n$, $\beta = n - \alpha$, except possibly when $\alpha = 2, 4$, $\beta = 1, 3$, or $(m, n, \alpha) = (3, 11, 6), (3, 13, 8), (3, 15, 8), (3, 15, 10), (3, 17, 10), (3, 21, 10)$.

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