HEATHER JORDON, Illinois State University

Alspach's Problem: The Case of Hamilton Cycles and 5-Cycles

In 1981, Alspach posed the following problem: Prove there exists a decomposition of K_n (n odd) or $K_n - I$ (n even) into cycles of lengths $m_1, m_2, \ldots, m_t$ whenever $3 \leq m_i \leq n$ for $1 \leq i \leq t$ and $m_1 + m_2 + \cdots + m_t = n(n-1)/2$ (number of edges in K_n) or $m_1 + m_2 + \cdots + m_t = n(n-2)/2$ (the number of edges in $K_n - I$). In this talk, we settle Alspach's problem in the case of Hamilton cycles and 5-cycles. We show that for all odd integers $n \geq 5$ and all nonnegative integers h and t with $hn + 5t = n(n-1)/2$, the complete graph K_n decomposes into h Hamilton cycles and t 5-cycles, and for all even integers $n \geq 6$ and all nonnegative integers h and t with $hn + 5t = n(n-2)/2$, the complete graph K_n decomposes into h Hamilton cycles, t 5-cycles, and a 1-factor.