

# Primitive Cycle Decompositions of $K_n$ and $K_n - I$

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We say that a decomposition  $\mathcal{D}$  of a simple graph  $G$  is *primitive* if no subset of  $\mathcal{D}$  acts as a decomposition of an induced subgraph of  $G$ ; this is a generalization of a system with no subsystem to arbitrary graphs. In this talk we discuss the existence of primitive cycle decompositions for  $K_n$  and  $K_n - I$ . We establish sufficient conditions for building primitive decompositions of graphs from decompositions of their subgraphs, create new and modify existing cycle decompositions to prove the existence of primitive  $C_m$ -decompositions for  $K_n$  and  $K_n - I$  for several infinite parameter families of  $m$  and  $n$ , and establish reduction results similar to that shown by Hoffman, Linder, and Rodger in 1989, Alspach and Jordon in 2001, and Šajna in 2002.