# Embedding Partial 4-Cycle Systems

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**Abstract**

This is joint work with Curt Lindner. A partial 4-cycle system is a collection of edge-disjoint 4-cycles. If their union is a complete graph then we have a (complete) 4-cycle system. These exist for orders congurent to 1 mod 8. Given a partial 4-cycle system of order $n$, the question addressed is: how large an order $t$ congurent to 1 mod 8 ensures that any partial 4-cycle system of order $n$ can be extended, or embedded, inside a (complete) 4-cycle system of order $t$. We shall sketch an argument to show that $t$ is big enough when

$$t = n + \sqrt{12}n^{\frac{3}{4}}$$

or larger. A known lower bound on $t$ is $n + \sqrt{n}$.