Avoiding subsystems in cycle systems

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A k-cycle decomposition of G is a partition of the edge set of G such that each element of the partition induces a k-cycle. If $G = K_n$ then it is called a k-cycle system of order n. The necessary and sufficient conditions for the existence of a k-cycle system of order n have already been determined. We aim to take this one step further. We will show how minute changes to systems can impact the structure of the k-cycle system in interesting ways. In particular, this talk will show there exists a k-cycle system $\mathcal{P}$ of order n such that *no* subset of $\mathcal{P}$ forms a k-cycle system of order t where $2 < t < n$ and both n and k are odd; if we can show this, we say that $\mathcal{P}$ contains no subsystems.