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Herding cats stuck in trees

In the game of Cat Herding on a graph, one player (the herder) will omnipresently delete edges, while the other player (the cat) is on a vertex of the graph, and will move along any path to a new vertex. Eventually, the cat is isolated on a single vertex, and the cat's objective is to delay this event, while the herder tries to hasten it. In an optimally played game, the number of cuts the herder made to isolate the cat is the *cat number* of the graph.

In this talk, we will investigate this graph parameter for both dense and sparse graphs. We will see an argument that the asymptotic behaviour of the cat number of complete graphs is $\frac{n^2}{3}$. We also look at an unexpected connection between cat herding on trees and Fibonacci numbers. In particular, we will see that trees with maximum cat number amongst graphs with n vertices have cat number asymptotically $\log_\phi n$.