

Martin Kassabov

Monday, November 7, 2022

Time: 4:00 p.m.

Location: Weber 223

Title: The Kuramoto model and Synchronization

Abstract: Synchronization occurs in many natural and technological systems, from cardiac pacemaker cells to coupled lasers. In the synchronized state, the individual cells or lasers coordinate the timing of their oscillations, but they do not move through space. A complementary form of self-organization occurs among swarming insects, flocking birds, or schooling fish; now the individuals move through space, but without conspicuously altering their internal states. Such systems are modelled by oscillators whose phase dynamics and spatial dynamics are coupled.

Karamoto developed a relatively simple model for such systems – numerical simulations show that this model often leads to a synchronisation, however several other types of behaviours are also possible. I will describe recent results proving that under some conditions the synchronisation is the only possible outcome.

This is a joint work with Steve Strogatz and Alex Townsend.

