

MATHEMATICAL EXPLORATIONS SEMINAR SERIES

[Seminar talks designed for undergraduate students]

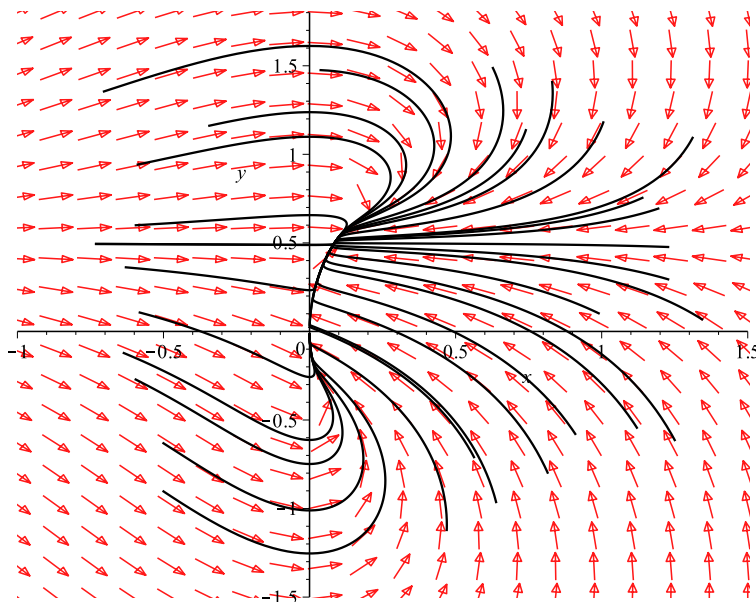
The geometry of differential equations

Professor Tom Ivey

Wed., April 13, 2016 at 3:10 pm, 104 RS Small

A differential equation (DE) is an equation involving an unknown function and its derivatives. DEs are the most common tool in applied mathematics, used to model a huge variety of natural phenomena, e.g., the mixing of chemicals, the growth of epidemics, the spread of rumors, and the flow of air around an airplane wing.

Most systems of DEs are now solved numerically by computers, but this talk is about understanding the qualitative nature of DEs by visualizing their solutions in two and three dimensions. In many cases, the DE itself can be translated into a geometric structure, like a vector field, a line field, or a plane field in these spaces. These structures are robust under changes of coordinates, and we can use them to answer basic questions like, how many solutions does the equation have, and how much information is necessary to pick out a unique solution? We can also begin to address harder equations like, how can I tell if two DEs are really the same after a change of variable?



Please join us for cookies in the Math Lounge:
346 RS Small at 2:45 pm.