

SPECIAL COLLOQUIUM

Dr Carmen Chicone
University of Missouri-Columbia

will present

Polar Coordinates Revisited

3:30 pm
Tuesday, November 30th
Violette Hall 1236

Abstract: The transformation from polar to rectangular coordinates, encountered in Calculus, is not one-to-one and it is not differentiable at the origin. These facts do not cause too much trouble; rather they invite a reinterpretation of polar coordinates as coordinates on a cylinder rather than on the plane. This construction (which is related to the concept called polar blowup in the theory of desingularization) will be explained. In addition, the utility of polar coordinates will be discussed in the context of differential equations. For example, we will consider a ‘new’ method for computing definite integrals of the form

$$\int_0^{2\pi} \frac{d\theta}{a \cos \theta + b \sin \theta + A \cos^2 \theta + B \cos \theta \sin \theta + C \sin^2 \theta}$$

using linear differential equations and transformation to polar coordinates; and we will discuss a method for studying the geometry of the solutions of some second order differential equations of the form

$$\frac{d^2x}{dt^2} + q(t)x = 0$$

where q is a periodic function.

This talk is for undergraduates who have completed a course of Calculus. A course of study including elementary differential equations will be helpful, but not essential, for understanding the latter part of the talk.

Dr. Chicone is a professor at the University of Missouri-Columbia. Afterwards he will talk about graduate studies in mathematics at Mizzou.

Cookies and Refreshments!!!