

Math Club

presents

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Calculus on a Sphere, Parallel Vectors and Foucault's Pendulum

Abstract: In 1851, French physicist Jean Foucault was the first to point out that a pendulum could be used to demonstrate the earth's daily rotation. He observed that the swing plane of the pendulum slowly rotated, in 24 hours, through an angle $2\pi \sin \phi$ where ϕ is the latitude on which the pendulum sits. We will give a differential geometric description of Foucault's pendulum based on calculus on a sphere.

We will define the notion of derivative of a vector field along a curve and introduce the concept of parallel vectors on a sphere. Based on these ideas, Foucault's observation will be derived as a simple consequence of a theorem about parallel translation of a tangent vector on the sphere.

No physics background is needed. Acquaintance with multivariable calculus and basic linear algebra will be assumed.

Monday, March 17, 4pm, D213, Abbotsford
All students, faculty and staff are invited to attend.