NEW RESULTS ON MAGNETIC CURVES

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Magnetic curves represent the trajectories of the charged particles moving on a Riemannian manifold under the action of the magnetic fields. They are modeled by a second order differential equation, that is $\nabla_{\gamma'}\gamma' = \phi\gamma'$, usually known as the *Lorentz equation*. Such curves are sometimes called also *magnetic geodesics* since the Lorentz equation generalizes the equation of geodesics under arc-length parametrization, namely, $\nabla_{\gamma'}\gamma' = 0$. In the last years, magnetic curves were studied in Käher manifolds and Sasakian manifolds, respectively, since their fundamental 2-forms provide natural examples of magnetic fields.

In this talk we present our recent investigation on magnetic curves on the unit tangent bundle of a Riemannian manifold M. We write the equation of motion for arbitrary M. In the case when M is a space form $M(c)$, we prove that every contact magnetic curve is slant. If $c \neq 1$, a contact normal magnetic curve is slant if and only if it satisfies a conservation law. These results generalize the beautiful paper of Klingenberg and Sasaki published in 1975 about geodesics on the unit tangent bundle of the 2-sphere.

This presentation is based on the following paper:

• J. Inoguchi and M. I. Munteanu: *Magnetic curves on tangent sphere bundles*, submitted.

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