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Higher codimensional Euclidean helix submanifolds

A submanifold of $\mathbb{R}^n$ whose tangent space makes constant angle with a fixed direction d is called a helix. Helix submanifolds are related with the Eikonal PDE equation. We will recall a method to find every solution to the Eikonal PDE on any Riemannian manifold, locally. As a consequence we give a local construction of arbitrary Euclidean helix submanifolds of any dimension and codimension. Also we characterize the ruled helix submanifolds and in particular we describe those which are minimal. Some motivations for the study of helix submanifolds comes from the physics of interfaces of liquid cristals. Part of these ideas have a natural extension when the ambient is a Riemannian manifold that admits a parallel vector field.

The next work was done in collaboration with Antonio Di Scala.