GOBIERNO DE ESPAÑA MINISTERIO DE EDUCACIÓN

DCT2009-00040-P

Resumen de la actividad docente a realizar

Profesor: **Luc Vrancken**
Nombre del curso: **Lagrangian Submanifolds**

Esquema y contenido del curso

El curso que se propone versa sobre el tema de subvariedades lagrangianas en diferentes espacios ambiente. Se impartirá en lengua inglesa. El curso tendrá una duración de una semana con 2 horas lectivas más 2 horas de atención al alumnado por cada día lectivo de la semana, dividiéndose el curso en dos temas:

Tema 1: Subvariedades Lagrangianas isotrópicas.

Tema 2: Subvariedades Lagrangianas de espacios de formas indefinidos.

Resumen en inglés:

A tensor T is called isotropic if $T(v, dots, v)$ is independent of the choice of unit length vector v. The first result about Lagrangian submanifolds admitting an isotropic tensor was due to Naitoh who classified isotropic parallel Lagrangian submanifolds of complex space forms. Later results are due to Montiel, Urbano and Ejiri. In both cases the tensor

$$T(X, Y, Z, W) =< h(X, Y), h(Z, W) >,$$

where h is the second fundamental form of the Lagrangian immersion. The classification result in this case either gives the parallel hypersurfaces of Naitoh or a special class of H umbilical Lagrangian submanifolds.

Of course the same question can also be asked for other geometric tensors like

$$T(X, Y, Z, W) =< \nabla h(X, Y, Z), JW >,$$

or

$$T(X, Y, Z, W, U, V) =< \nabla h(X, Y, Z), \nabla h(W, U, V) >,$$

The first condition actually can be used to characterize the Whitney spheres, together with the parallel Lagrangian submanifolds. Whereas the second one is more difficult to treat and so far a classification of it is only known in dimension 3.

Of course another possibility to generalize the previous results is to look at Lagrangian submanifolds of indefinite complex space forms. As a basic ingredient in the positive definite case which is the choice of a canonical frame based on the choice of e_1 as a vector on which a certain function on a compact set attains an absolute maximum breaks down in the indefinite case; new methods need to be developed. In this series of lectures we will also discuss some recent results which give a classification in the Lorentzian case and in the arbitrary dimensional case, provided the dimension is not too big.