LECTURE II

CONTACT BETWEEN SUBMANIFOLDS

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In this lecture we discuss the relation between the singularities of certain special families of mappings defined on a submanifold in n-space and the geometry of the submanifold.

This conection between singularity and geometry is based on the concept of contact between the given submanifold and *model submanifolds* (r-planes and r-spheres). These contacts can be described in terms of the contact group of a convenient mapping. This idea was first introduced by J. Mather for equidimensional manifolds, and extended by J. Montaldi to the general case.

The *height functions family* and the *distance squared functions family* give the contacts of the submanifold with hyperplanes and spheres, respectively. Due to a result of E. Looijenga, it follows that there exists a dense set of embeddings of a manifold in Euclidean space for which the contacts with hyperplanes and hyperspheres are *stable*.

We apply contact theory and the genericity theorems to investigate the extrinsic geometry of surfaces in 3-spaces.

The following topics will be discussed:

- Contact between manifolds;
- The height functions family and the distance squared functions family;
- The genericity theorems;
- Surfaces in 3-spaces.

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