Title : Di\_erential geometric models in almost complex manifolds

**Abstract** : In 2005, families of new examples of homogeneous domains were presented by K. H. Lee---homogeneous in the sense that the action by their J-holomorphic automorphism group is transitive. To a surprise to many experts, such examples are almost-complex but not complex. They are complete Kobayashi hyperbolic, in the sense that the Kobayashi-Royden metric is well-defined, positive-definite and its integrated distance is Cauchy complete. Such examples were formerly expected to be non-existent, or if exist, they should be very rare, such as finitely many. But not only are there infinitely many such examples, but they form a continuous family when the dimension (of the manifold) is 6 or higher. We call such homogeneous domain model. In this talk, we introduce the models and discuss the differential geometry of the models. First we construct an invariant hermitian metric, which is turned out to be the Kobayashi-Royden metric. Next, we discuss the geometric invariants, such as holomorphic sectional curvature, torsion invariants, etc. Finally we discuss the characterization of the models with the invariants, as we mentioned.