ANALYSIS SEMINAR.

Speaker: NEFTON PALI (Princeton)

Tuesday, April 26, 2005, 4:00 p.m., VV B139 :
"ANALYTIC ZEROS OF SMOOTH FUNCTIONS"

ABSTRACT: We will explain a differential criteria which allows us to find complex analytic zeros of smooth functions. An application of our criteria concerns a method which allows us to find analytic sets which are obtained by smooth deformations of other ones.

We will give a skech of the proof in some particular case. The principal difficulty of the proof is the solution of a quasi-linear differential equation with standard $\bar{\partial}$ as its principal term. We are able to find a solution of this differential equation, using a rapidly convergent iteration scheme of Nash-Moser type.

Wednesday, April 27, 2005, 1:20 p.m., Room B115:
"PLURISUBHARMONIC FUNCTIONS ON ALMOST COMPLEX MANIFOLDS."

ABSTRACT: If (X, J) is an almost complex manifold, then a function u is said to be plurisubharmonic on X if it is upper semi-continuous and its restriction to every local pseudo-holomorphic curve is subharmonic. As in the complex case, it is conjectured that plurisubharmonicity is equivalent to the positivity of the (1,1)-current $i\partial\bar{\partial}u$, (the $(1,1)$-current $i\partial\bar{\partial}u$ need not be closed here!). The conjecture is trivial if u is of class $\mathcal{C}^2$.

The result is elementary in the complex integrable case because the operator $i\partial\bar{\partial}$ can be written as an operator with constant coefficients in complex coordinates. Hence the positivity of the current is preserved by regularizing with usual convolution kernels. This is not possible in the almost complex non integrable case and the proof of the result requires a much more intrinsic study.

We are able to prove the necessity of the positivity of the $(1,1)$-current $i\partial\bar{\partial}u$. We prove also the sufficiency of the positivity in the particular case of an upper semi-continuous function f which is continuous in the complement of the singular locus $f^{-1}(-\infty)$.