Mini-course

2020 Taipei-Hsinchu Conference on Geometric Invariance and Partial Differential Equations

講題　1. Compactness of Conformally Compact Einstein Manifolds in Dimension 4.
2. Improved Moser-Trudinger-Onofri Inequality under Constraints.

講者　張聖容教授 Prof. Sun-Yung Alice Chang
(Princeton University)

時間　講題1: 10:00-11:30am on 2019.12.29-30
講題2: 10:00-11:30am on 2020.1.2

地點　Lecture Room B, 4th Floor, General Building III

籌 辦 者　Jih-Hsin Cheng (Academia Sinica)
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講題1: Compactness of Conformally Compact Einstein Manifolds in Dimension 4.

Abstract: Given a manifold $(M^n,[h])$, when is it the boundary of a conformally compact Einstein manifold (X^{n+1},g_+) with $r^2g_+|M=h$. This problem of finding "conformal filling in" is motivated by problems in the AdS/CFT correspondence in quantum gravity (proposed by Maldacena in 1998) and from the geometric considerations to study the structure of non- compact asymptotically hyperbolic Einstein manifolds. The problem is largely open, but recently there has been substantial progress made in this research area. I will present the background and some recent progress concerning the aspects of the existence and non-existence, the uniqueness and compactness results of this problem.

講題2: Improved Moser-Trudinger-Onofri Inequality under Constraints.

Abstract: I will report some recent joint work with Fengbo Hang. A classical result of Aubin states that the constant in Moser- Trudinger-Onofri inequality on S^2 can be imporved for furnctions with zero first order moments of the area element. We generalize it to higher order moments case. These new inequalities bear similarity to a sequence of Lebedev- Milin type inequalities on S^1 coming from the work of Grenander-Szego on Toeplitz determinants (as pointed out by Widom). We also discuss the related sharp inequality by the method of perturbation.