Dimension Theories in Topology, Coarse Geometry, and C*-algebras

Hung-Chang Liao

University of Münster

Germany

The concept of dimension appears in many areas of mathematics. Very often, the dimension measures the complexity of a mathematical object. In the series of talks, we discuss dimension theories in three particular areas: topology, coarse geometry, and C*-algebras. We start by reviewing the Lebesgue covering dimension for topological spaces.

Then we move on to the notion of asymptotic dimension in coarse geometry, which is a large-scale analog of covering dimension. Finally we look at noncommutative covering dimension for C*-algebras, and discuss the interactions between these three dimension theories. Here are some related references.

1. G. Bell, and A. Dranishnikov, Asymptotic dimension, *Topology Appl.* **155** (2008), 1265-1296.

2. Nathanial P. Brown, and Narutaka Ozawa, *C*-algebras and finite-dimensional approximations,* Graduate Studies in Mathematics **88**, American Mathematical Society, Providence, RI, 2008.

3. Piotr W. Nowak, and Guoliang Yu, *Large scale geometry*, EMS Textbooks in Mathematics, European Mathematical Society, Zrich, 2012.

4. John Roe, *Lectures on coarse geometry*, University Lecture Series **31**, American Mathematical Society, Providence, RI, 2003.

5. Wilhelm Winter, and Joachim Zacharias, The nuclear dimension of C*-algebras, *Adv. Math.* **224** (2010), 461-498.