

## $L^p$ BOUND ON MAXIMAL AVERAGES

Maximal functions of various forms play fundamental roles in classical harmonic analysis. This series of five lectures concerns  $L^p$  boundedness of maximal functions defined by averages over submanifolds such as hypersurfaces and curves. Stein's spherical and Bourgain's circular maximal theorems are among the most famous results. The first part of the lectures aims to provide a broad overview of aspects of maximal estimates. In the third and four lectures we study  $L^p$  boundedness of the maximal operator defined by the dilates of submanifolds, such as the spherical and circular maximal functions. In the last one, we discuss the most recent development concerning the maximal function for the space curves. The details of the lectures are as follows:

- Lecture 1. Maximal functions and their roles
- Lecture 2. Maximal averages over submanifolds
- Lecture 3. The spherical maximal theorem (averages over hypersurfaces)
- Lecture 4. The circular maximal theorem
- Lecture 5. Maximal estimates for averages over space curves