

# MYSAGA 2021 LECTURES

## LECTURER 1: Prof. Michael G. Cowling (UNSW, Sydney)

**Title:** The Laplace-Beltrami Operators

**Abstract:**

The first lecture introduces manifolds, the Laplace-Beltrami and similar operators, estimates involving  $L^p$ , spectrum of the Laplace-Beltrami operator on a compact manifold and distribution of eigenvalues, clustering of eigenvalues and symmetry, and estimates for the Laplace-Beltrami operator.

The second lecture will discuss compact Lie groups, which include maximal tori, representation and characters, the Plancherel formula, eigenfunctions and eigenvalues of the Laplace-Beltrami operator on a compact Lie group.

The third lecture will present some applications of the Laplace-Beltrami operators, which include estimates of the Laplace-Beltrami operator, multiplier theorems, and averaging theorems.

**Schedule:** August 11-12, 11.00-11.50 (+Discussion at 11.50-12.30); August 13, 10.10-11.00 (+Discussion at 11.00-11.20)

## LECTURER 2: Dr. Denny Ivanal Hakim (ITB, Bandung)

**Title:** Bernstein Polynomials and Kantorovich Operators

**Abstract:**

In the first lecture, we will discuss an introduction to theory of Bernstein polynomials and Kantorovich operators. We first recall the definition and some examples of Bernstein polynomials and also the proof of the Weierstrass Approximation Theorem. After this discussion, we revisit the failure of Bernstein polynomials in approximating some discontinuous functions and we use this observation as a motivation of Kantorovich operators. We also discuss the relation between Bernstein polynomials and Kantorovich operators.

In the second lecture, we discuss the behaviour of Kantorovich operators in Lebesgue spaces. More precisely, we recall some results on the uniform boundedness and the convergence of Kantorovich operators in these spaces.

In the third lecture, we consider Kantorovich operators in Morrey spaces. We discuss the recent result about the uniform boundedness and the convergence of Kantorovich operators, obtained by Burenkov, Ghorbanalizadeh, and Sawano. In addition, we present our result on the endpoint case of the convergence of Kantorovich operators in Morrey spaces and we discuss several questions related to Kantorovich operators in Morrey spaces and other function spaces.

**Schedule:** August 11-12, 09.00-09.50 (+Discussion at 09.50-10.30); August 13, 08.30-09.20 (+Discussion at 09.20-09.50)