

NCM Workshop on Schubert Varieties

Name of the workshop, venue, and dates

NCM Workshop on Schubert Varieties
The Institute of Mathematical Sciences (IMSc), Chennai
23 October to 04 November 2017

Names of organizers

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Names of resource persons (in alphabetical order)

Sudhir R. Ghorpade (IIT Bombay)
Amritanshu Prasad (IMSc, Chennai)
K. N. Raghavan (IMSc, Chennai)
Vijay Ravikumar (CMI, Chennai)
Parameswaran Sankaran (IMSc, Chennai)
Evgeny Smirnov (HSE, Moscow)
Sankaran Viswanath (IMSc, Chennai)

A brief description of the workshop

Schubert varieties lie at the cross roads of algebraic geometry, combinatorics, commutative algebra, and representation theory. They are an important class of subvarieties of flag varieties, interesting in their own right, and providing an inductive tool for studying Grassmannians and flag varieties. The literature on them is vast, for they are ubiquitous—they have been intensively studied over the last fifty years, from many different points of view and by many different authors. The study of Schubert varieties is closely related to the combinatorics of symmetric polynomials, especially, Schur polynomials, and their generalizations, known as Schubert polynomials. In this workshop, connections between these topics will be highlighted. Moreover, we will also touch upon the REPRESENTATION THEORY OF FINITE GROUPS, especially the symmetric groups. This theory has been an area of intense research ever since its advent in the late nineteenth century. The theory is an important tool in several branches of mathematics, e.g., geometry, number theory, and combinatorics.

The pre-requisites being kept to a minimum, this workshop should be accessible to anyone with a background in algebra, geometry, and topology, as for example taught in standard Ph.D. courses at the premier research institutes of the country. We will roughly follow the monograph by LAURENT MANIVEL with title *Symmetric Functions, Schubert Polynomials and Degeneracy Loci* (volume number 6 in the series *SMF/AMS Texts and Monographs*), American Mathematical Society, 2001.

Syllabus

Speaker	No. of lectures	Topics
I (AP)	6	Ring of Symmetric Functions Chapter 1
II (SV)	6	Characters of Symmetric Groups Chapter 1
III (VR/PS)	6	Schubert Polynomials and a Review of Singular Homology Chapter 2 and Appendix A to Chapter 3
IV (KNR)	6	Computation of Schubert Polynomials, Schur Functions Chapter 2
V (SRG)	6	Grassmannians, Schubert Varieties, Standard Monomials Chapter 3
VI (ES)	6	Singularities of Schubert Varieties, Degeneracy Loci Chapter 3

Resource persons

Sudhir R. Ghorpade (SRG)
 Amritanshu Prasad (AP)
 K. N. Raghavan (KNR)
 Vijay Ravikumar (VR)
 Parameswaran Sankaran (PS)
 Evgeny Smirnov (ES)
 Sankaran Viswanath (SV)

The discussion sessions will be lead by the speakers themselves.

Chapters refer to those in the main reference, namely:

Laurent Manivel, *Symmetric Functions, Schubert Polynomials and Degeneracy Loci*,
 SMF/AMF Texts and Monographs, IIIol. 6, Amer. Math. Soc., Providence, 2001.

Timetable

Day	Date	Lecture 1 0930–1100	Lecture 2 1130–1300	Lecture 3 1400 to 1530	Discussion Hr. 1600–1700
1	23rd Oct	I	V	III (VR)	I, V, and III
2	24th Oct	I	V	III (VR)	I, V, and III
3	25th Oct	I	V	III (VR)	I, V, and III
4	26th Oct	I	V	III (PS)	I, V, and III
5	27th Oct	I	V	III (PS)	I, V, and III
6	28th Oct	I	V	III (VR)	I, V, and III
7	30th Oct	II	IV	VI	II, IV, and VI
8	31st Oct	II	IV	VI	II, IV, and VI
9	1st Nov	II	IV	VI	II, IV, and VI
10	2nd Nov	II	IV	VI	II, IV, and VI
11	3rd Nov	II	IV	VI	II, IV, and VI
12	4th Nov	II	IV	VI	II, IV, and VI