Geometry and Control

Overview

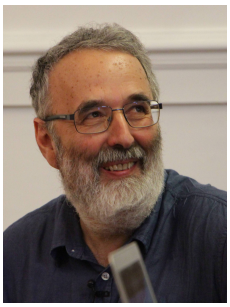
Optimal control theory, the natural successor and refinement of calculus of variations in mathematics, has been heavily influenced by geometry right from the time of its birth. In particular, defining control systems as collections of vector fields equipped with certain natural operations on them has proved to be an especially fruitful idea in this respect, enabling a plethora of tools from differential geometry to enter the foreground of analysis and control synthesis techniques. The converse influence — that of optimal control theory influencing geometry — has only recently started to take effect, with the development of subriemannian geometry inspired by optimal control problems. This course explores the central ideas in optimal control from the geometric viewpoint, with special emphasis on the geometric version of the Pontryagin maximum principle — a cornerstone in constructive control techniques, culminating in a treatment of the emerging area of subriemannian geometry inspired by optimal control.

The chief sources are the book, "*Control Theory from the Geometric Viewpoint*" by A. Agrachev and Yu. Sachkov, Springer, 2004, and the set of Lecture Notes, "*Introduction to Riemannian and Subriemannian Geometry*", freely downladable from `https://webusers.imj-prg.fr/~davide.barilari/ABB-SRnotes-110715.pdf`
The material from these texts will be adapted for engineering students.

Logistics	◦ 08-20 Jan: Optimal control and subriemannian geometry ◦ Number of participants will be limited to 50
Intended audience	◦ Students at all levels (BTech/MSc/MTech/PhD) and Faculty Members from academic and technical institutions across the world ◦ Engineers working in service and government organizations including R&D laboratories across the world
Fees	◦ Participants from India: ▷ Academic institutions: ₹10,000 per person ▷ Students: ₹3,000 per person ▷ Industry: ₹20,000 per person ◦ Participants from abroad: US$500 per person ◦ The above fees include all instructional material, computer use for tutorials and assignments, 24 hr free internet facility. The participants will be provided with accommodation on payment basis.

The Faculty

Andrei Agrachev is a Professor of Mathematics, SISSA-ISAS, International School for Advanced Studies, Italy. Andrei's research straddles the vast domains of control theory, geometry and analysis, and dynamical systems. His research interests in engineering center around control theory with special emphasis on optimal control, and his interests in mathematics center around geometry, dynamical systems. His wide-ranging expertise is the central element behind his seminal contributions to control theory and differential geometry.



Debasish Chatterjee is an Associate Professor with Systems & Control Engineering, IIT Bombay, India. His research interests lie in constrained control, the interface of machine learning and control theory, and stochastic and optimal control.

Course coordinator:

Debasish Chatterjee
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Email: dchatter@iitb.ac.in

GIAN Short Term Course on

Geometry and Control

08 – 20 Jan 2018

Registration Form

Name(in block letters): _____
_____

Qualification:

Designation: _____

Organization:_____

Mailing Address:_____
_____
_____
_____
Mobile:_____
Fax:_____

Email:_____

Payment: Rs:_____

DD No.:_____Dt: _____

(DD in favour of "Registrar, IIT Bombay – CEP a/c")

Or NEFT/ RTGS
(Please furnish the foll. details if NEFT/RTGS)
Name of A/c Holder
UTR NO./Transaction ID
Name of Bank & Branch
Date of Payment
Amount

IIT Guest House/ Hostel accommodation required: YES / NO

Signature of Applicant:_____

Date:

Venue for Classes
Classes will be held in the Victor Menezes Convention Centre, IIT Bombay.

Lecture Notes
To fully realize the objectives of the course, lecture notes will be made available at the time of registration at IIT Bombay.

Date & Time of Registration:
08th Jan 2018, 9.00 AM at Victor Menezes Convention Centre, IIT Bombay.

COURSE FEE
Participants from abroad: US $500/-

Industry/ Research Organizations: INR: 20000/-

Academic Institutions/ Faculty/ NGO: INR: 10000/-

Students & Research Scholars: INR: 3000/-

The above fees include all instructional materials, computer use for tutorials and assignments, laboratory usage charges, free internet facility. Subject to availability, the participants will be provided with accommodation on payment basis.

The fees may be paid by demand draft drawn in favour of "**The Registrar, IIT Bombay - CEP Account".**

Or through NEFT/RTGS:

Name of beneficiary: Registrar, IIT Bombay
Account name: IIT Main Account
Name of Bank: State Bank of India, IIT Powai
Beneficiary A/C No: 00000010725729128
Bank MICR Code: 400002034
IFSC Code: SBIN0001109
SWIFT Code: SBININBB519

Send the completed forms (only) by post to:
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IIT Bombay, Powai
Mumbai 400076, India