Avinash Kumar

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PRESENT DESIGNATION

Postdoctoral Researcher (24/04/2023- present)
Télécom SudParis 19 rue Marguerite Perey 91120,
France.

TEACHING EXPERIENCE

Assistant Professor (22/03/2022-06/03/2023**)**
School of Computer Science,
UPES, Dehradun, India.

EDUCATION

Doctor of Philosophy *July 2016- January 2022*
School of Computing and Electrical Engineering
Indian Institute of Technology (IIT) Mandi, Himachal Pradesh, India.
Supervisor: Dr Tushar Jain

Master of Technology *August 2014- June 2016*
Electrical Engineering Department
National Institute of Technology (NIT) Hamirpur, Himachal Pradesh, India.
Supervisor: Dr Bharat Bhushan Sharma

Bachelor of Technology *July 2010 - June 2014*
Electronics and Communication Engineering
RIEIT, SBS Nagar,Punjab, India.

RESEARCH INTERESTS

Optimal control, linear matrix inequalities, Krotov framework, multi-agent systems, structured control design, networked control.

PhD Thesis Title- "Optimal Control Design in Krotov Framework".

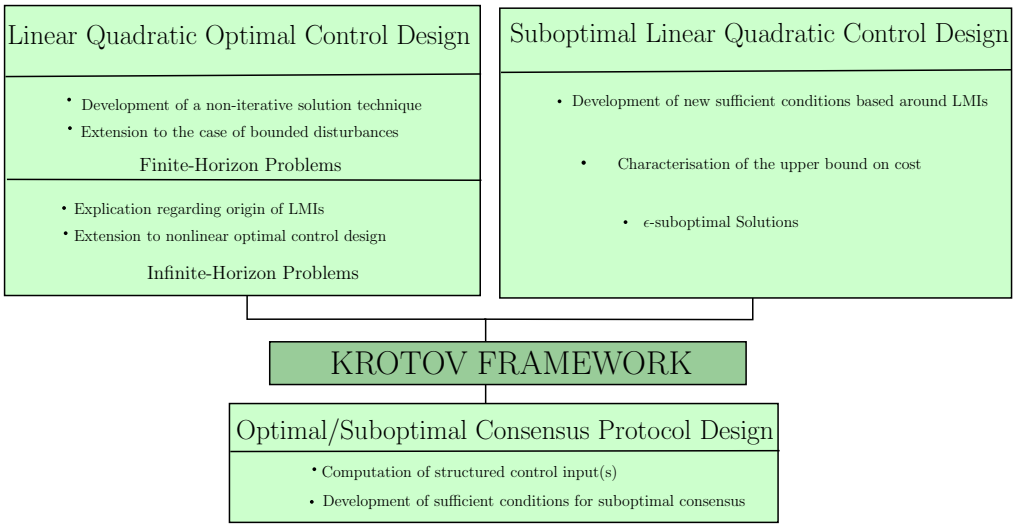

Figure 1: PhD Thesis contributions

ACADEMIC ACHIEVEMENTS

- Worked as an Associate Teacher for the course Data Science II at IIT Mandi in even semester Feb-June, 2020 and won an award for recognition of significant role in TAship.
- *Best paper award* for the paper entitled "Sub-optimal Control Design for Second Order Non-linear Systems using Krotov Sufficient Conditions" at ACODS-2020, IIT Madras.
- *Best presentation award* for the paper entitled "Optimal Consensus Protocol Design for Scalar Single Integrators using Krotov Conditions" at ACODS-2020, IIT Madras.
- *Gold-medalist* in Master of Technology, National Institute of Technology, Hamirpur, Himachal Pradesh, India.
- Qualified UGC-NET (Electronic Science)-December-2015, GATE 2014 (AIR-7046) and GATE 2016 (AIR-4303).
- Received Half-time Teaching/Research Assistantship (HTRA) provided by the Ministry of Human Resource and Development (MHRD), India, during MTech and PhD.
- Worked as a teaching assistant for the NPTEL (National Programme on Technology Enhanced Learning) online certification course entitled "Linear Dynamical Systems". Link to the course
- Attended various workshops and conferences of national and international level.

PUBLICATIONS

1. **Avinash Kumar** and Tushar Jain, "Suboptimal Consensus Protocol Design for a Class of Multiagent Systems" (Pre-print).
2. **Avinash Kumar** and Tushar Jain, "An Alternative Method for Optimal Consensus Protocol Design for Scalar Single-integrators using Krotov Conditions" in IFAC-PapersOnLine, Volume 53, Issue 2, Pages 2982-2987, 2020. https://doi.org/10.1016/j.ifacol.2020.12.977.
3. **Avinash Kumar** and Tushar Jain, "Sub-optimal Consensus Protocol Design for Double Integrator Agents using Krotov Conditions" in IFAC-PapersOnLine, Volume 53, Issue 1, Pages 483-487, 2020. https://doi.org/10.1016/j.ifacol.2020.06.081.
4. **Avinash Kumar** and Tushar Jain, "Sub-optimal Control Design for Second Order Non-linear Systems using Krotov Sufficient Conditions" in IFAC-PapersOnLine, Volume 53, Issue 1, Pages

272-276, 2020. https://doi.org/10.1016/j.ifacol.2020.06.046.

5. **Avinash Kumar** and Tushar Jain, "Optimal Consensus Protocol Design for Scalar Single Integrators using Krotov Conditions" in IFAC-PapersOnLine, Volume 53, Issue 1, Pages 471-476, ISSN 2405-8963, 2020. https://doi.org/10.1016/j.ifacol.2020.06.079.
6. **Avinash Kumar** and Tushar Jain, "Some Insights on Synthesizing Optimal Linear Quadratic Controllers Using Krotov Sufficient Conditions," in IEEE Control Systems Letters, vol. 4, no. 2, pp. 486-491, April 2020. doi: 10.1109/LCSYS.2019.2959651.
7. **Avinash Kumar** and Tushar Jain, "Optimal and Sub-optimal Control Design for Second Order Nonlinear Affine Systems using Krotov Sufficient Conditions," 2019 4th Conference on Control and Fault Tolerant Systems (SysTol), Casablanca, Morocco, pp. 401-405, 2019. doi: 10.1109/SYSTOL.2019.8864735.
8. **Avinash Kumar** and Tushar Jain, "Suboptimal Control of Linear Systems with Bounded Disturbances using Krotov sufficient Conditions," 2019 IEEE Conference on Control Technology and Applications (CCTA), Hong Kong, China, pp. 830-834, 2019. doi:10.1109/CCTA.2019.8920685.
9. **Avinash Kumar** and Tushar Jain, "Analytical Infinite-time Optimal and Sub-optimal Controllers for Scalar Nonlinear Systems using Krotov Sufficient Conditions," 2019 18th European Control Conference (ECC), Naples, Italy, pp. 3237-3241, 2019. doi: 10.23919/ECC.2019.8796202.
10. **Avinash Kumar** and Tushar Jain, "Computation of Non-iterative Optimal Linear Quadratic Controllers using Krotov's Sufficient Conditions," 2019 American Control Conference (ACC), Philadelphia, PA, USA, pp. 4923-4928,2019. doi: 10.23919/ACC.2019.8815216.
11. **Avinash Kumar** and Tushar Jain,"Computation of Linear Quadratic Regulator using Krotov Sufficient Conditions," 2019 Fifth Indian Control Conference (ICC), New Delhi, India, pp. 365-370, 2019. doi: 10.1109/INDIANCC.2019.8715621.
12. **Avinash Kumar** and Subashish Datta,"Elimination of Expensive Sensors in Static State Feedback Control with Specified Transient Behaviour," 2019 Fifth Indian Control Conference (ICC), New Delhi, India, pp. 74-78,2019. doi: 10.1109/INDIANCC.2019.8715617.

PAPERS PRESENTED

1. **Avinash Kumar** and Bharat Bhushan Sharma, "Comparison of meta-hueristic optimization techniques for the identification of a hyperchaotic system", International Conference on Recent Trends in Engineering and Material Sciences (17-19 March 2016), JNU Main Campus, School of Engineering, Jaipur National University, Jaipur,Rajasthan, India.
2. **Avinash Kumar** and Bharat Bhushan Sharma, "Non linear system identification using a real coded genetic algorithm", Section Annual Convention, SAC-15, National Institute of Technology Hamirpur, Himachal Pradesh, India.

REFERENCES

- **Tushar Jain**

  Affiliation: Associate Professor, School of Computing and Electrical Engineering (SCEE), Indian Institute of Technology (IIT) Mandi, Himachal Pradesh, India- 175005.

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- **Subashish Datta**

  Affiliation: Assistant Professor, Department of Electrical Engineering, IIT Delhi, India- 110016.

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- **Maben Rabi**

  Affiliation: Professor, Department of Computer Science and Communication, Østfold University College, Norway P.O.Box 700 NO-1757.

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- **Bharat Bhushan Sharma**

  Affiliation: Associate Professor, Electrical Engineering Department, National Institute of Technology, Hamirpur, Himachal Pradesh, India-177005.

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