

ICTS Thesis Defense Seminar

- Title** : Numerical Filter Stability, Fokker-Planck Equations and Infinite Dimensional Optimization with Deep Learning
- Speaker** : Pinak Mandal (ICTS-TIFR, Bengaluru)
- Date** : Tuesday, 16th April 2024
- Time** : 5:00 PM (IST)
- Abstract** : We tackle three different problems. All three problems are enveloped by the overarching theme of numerical optimization. Our first problem is to evaluate stability of nonlinear filtering algorithms when the underlying dynamics is deterministic. We demonstrate that popular filtering algorithms are exponentially stable and discover a relationship between filter RMSE and filter stability. Our second problem is to devise an algorithm to solve Fokker-Planck equations in high dimensions. We use a deep learning algorithm to compute the non-trivial zeros of the Fokker-Planck operator. We show that combining these zeroes with an appropriate Feynman-Kac formula gives us the solution to the time-dependent Fokker-Planck equation. Lastly, we discuss two deep learning algorithms for solving constrained optimization problems in infinite dimensional Hilbert spaces. We test these algorithms on some toy problems inspired by calculus of variations and physics.
- Venue** : Online Seminar
- Zoom link: <https://icts-res-in.zoom.us/j/99186506765?pwd=d0pueFFtNVRQY2pobzNXZU1nOEEx0UT09>
- Meeting ID: 991 8650 6765
- Passcode: 151505