



Module PMRF-ISSS011/2023

Markov chain and Algorithmic applications

Name of the PMRF student

Kirtan Vora

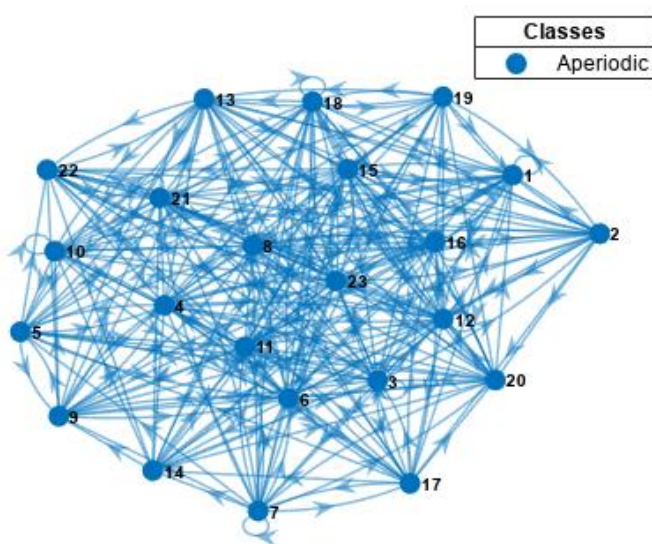
Required background of the students taught

Computer Science, Mathematics,
Electrical Engineering

Pre-requisites: Basic Probability Theory,
Linear Algebra

Online session coordinator

Will be chosen from the list of registrants



Details of the content of the module

In this lecture series we will study some general properties of Markov chains, particularly its mixing time and how we can use it to generate samples from various types of Markov chains

Introduction: Markov chains, classification of states, periodicity, Recurrence, transience, positive/null-recurrence, examples of classical Markov chains.

Coupling and Mixing time: Total Variation Distance and its relation with Mixing time, Lower Bound on Mixing time using Bottle Neck Ratio.

Random Walk on Graphs: Commute time using effective resistance of graph, Cover time, Cheeger's Inequality, Bounding Mixing time using Spectral techniques.

Sampling: Rejection sampling, Metropolis Algorithm, Glauber Dynamics and its application(function minimization, coloring problem) , coupling from the past(Propp-Wilson theorem)

Schedule of the module

- Live lectures on Monday and Friday(9:30 AM to 12:30 PM with breaks in between)
- In unforeseen situations, recorded lectures will be uploaded on Monday or Friday by 9:30 PM
- Starts: 29th September 2023
- Ends: 23th October 2023

Meeting link : Will be shared later

Contact email ID: issforum@gmail.com

Registration link:

<https://forms.gle/RiUVvcaQcTmZ9m7r6>