

## Ph.D. Thesis Defense

### Entropy and pressure for holomorphic correspondences.

*By*

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#### Abstract

In this talk, we study certain aspects in the realm of thermodynamic formalism of holomorphic correspondences on the Riemann sphere. We begin our study with polynomial correspondences of degree  $d$  in both variables and identify a class of correspondences which we call the maps of  $d$ -tuples, that provide a simplified model for tracing the orbits. We obtain characterising conditions for such correspondences. Then, we extend the ideas of certain notions that one studies in the thermodynamic formalism of maps to the context where the dynamics in the phase space evolves by holomorphic correspondences. Towards that end, we develop the notion of spanning sets and define the topological entropy of holomorphic correspondences using spanning sets. We prove that this definition coincides with the existing definition of topological entropy based on separated sets. This naturally leads us to the concept of topological pressure of continuous functions. Alongside, we identify a class of measures supported on the Riemann sphere and develop the concept of measure-theoretic entropy of holomorphic correspondences with respect to those measures. We then obtain the equivalent versions of the variational principle in the context of holomorphic correspondences, which relate the measure-theoretic entropy, integral of the function, and topological pressure in appropriate settings. Finally, we focus on a particular class of holomorphic correspondences, restricted to the support of its Dinh-Sibony measure, and define a Ruelle operator with respect to a continuous function belonging to an appropriate Banach space. We study the convergence of the iterates of the Ruelle operator and from that obtain information about the spectral properties of the operator. We also investigate the relation between its spectral radius and the topological pressure function.

**Date: June 30, 2026**

**Time: 5.00 PM, Venue: Harish Chandra Seminar Hall.**