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INTRODUCTION TO FARAHAT-HIGMAN RINGS

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Abstract

The talk will consist of two parts in different natures. In the first 45 minutes we will introduce the concept of Farahat-Higman rings. This will be done through reviewing the original work of Farahat and Higman in which they studied the center of the group rings $\mathbb{Z}[S_n]$ over the symmetric group of n letters. We will present their proof of the existence of a universal filtered \mathbb{Z} -algebra \mathcal{Z} that governs the center of the group algebras $\mathbb{Z}[S_n]$. We will also present a conceptual explanation of the work of Farahat and Higman. The conceptual explanation enables one to generalize the work of Farahat and Higman to groups such as wreath products $G \wr S_n$, where G is a finite group, the general linear group $GL_n(\mathbb{F}_q)$ over finite fields or symplectic groups $Sp_n(\mathbb{F}_q)$ over finite fields. In the second lecture we will briefly apply the method to the center of the group rings $\mathbb{Z}[Sp_n(\mathbb{F}_q)]$ and present the proof of the existence of a universal filtered \mathbb{Z} -algebra that governs the center of the algebras $\mathbb{Z}[Sp_n(\mathbb{F}_q)]$.

If time permits, we will present the semi-group method of Ivanov and Kerov. The semi-group method demystifies the work of Farahat and Higman.

Date : Tuesday, December 17, 2019

Time: 14:00

Place: IMBM Seminar Room, Boğaziçi University South Campus