DEFENSE OF THE DOCTORAL DISSERTATION

"A Solomon-Tits theorem for rings"

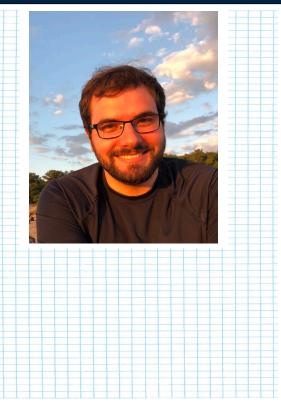
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Monday, March 4, 2024 Time: 12:00 PM Location: 311 DeBartolo

Examination Committee: Andy Putman, Advisor Mark Behrens Nick Salter Chris Schommer-Pries



Abstract:

An analogue of the Tits building is defined and studied for commutative rings. We prove a Solomon-Tits theorem when R either satisfies a stable range condition, or is the ring of S-integers of a global field. We then define an analogue of the Steinberg module of R and study it both as a \mathbb{Z} -module and as a representation. We find the rank of Steinberg when R is a finite ring, and compute the length of $St_2(R) \otimes \mathbb{Q}$ as a $GL_2(R)$ -representation when R is uniserial. As an application of these results, we produce a lower bound for the rank of the top-dimensional cohomology of principal congruence subgroups of nonprime level