

# INVITATION TO THE DOCTORAL SEMINAR

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**“The 334-Triangle Graph of  $SL_3(\mathbb{Z})$ ”**

📍 N.1.43



Wednesday, 13 December 2023



10:35 a.m.

## Abstract

The 334-triangle group,  $T = \langle a, b \mid a^3 = b^3 = (ab)^4 = e \rangle$ , is important in the study of thin groups because its representations in  $SL_3(\mathbb{Z})$  provide examples of thin group candidates. We introduce a graph on the order three elements of a group  $G$  which visualizes the representations of  $T$  in  $G$ . For any group  $G$ , the 334-triangle graph of  $G$ , which we denote by  $\Delta_{334}(G)$ , is the graph whose vertices are the elements  $a \in G$  such that  $a^3 = e$ , in which there is an edge between two vertices  $a$  and  $b$  if and only if  $(ab)^4 = e$ . In this talk we will prove a number of properties of 334-triangle graphs in general before narrowing our focus to  $\Delta_{334}(SL_3(\mathbb{Z}))$ ,  $\Delta_{334}(SL_3(\mathbb{Z}/2\mathbb{Z}))$ , and  $\Delta_{334}(SL_3(\mathbb{Z}/3\mathbb{Z}))$ . We will use information about  $\Delta_{334}(SL_3(\mathbb{Z}/2\mathbb{Z}))$  to show that the chromatic number of  $\Delta_{334}(SL_3(\mathbb{Z}))$  is at most eight. By generating a portion of  $\Delta_{334}(SL_3(\mathbb{Z}))$  we show its chromatic number is at least four; we conjecture it is equal to four.

Andrei Asinowski and the Department of Mathematics look forward to seeing you at the talk!

