ALPEN-ADRIA UNIVERSITÄT KLAGENFURT

INVITATION TO THE DOCTORAL SEMINAR

# The 334-Triangle Graph of $SL_3(\mathbb{Z})$

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## 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.

**We hope to see you there!**