A finite presentation of the level 2 principal congruence subgroup of $GL(n;\mathbb{Z})$ and its application

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Abstract. Let $\Gamma_2(n)$ be the kernel of the homomorphism from $GL(n;\mathbb{Z})$ to $GL(n;\mathbb{Z}/2\mathbb{Z})$. Note that for an element $A$ in $\Gamma_2(n)$, the diagonal entries of $A$ are odd, the other entries are even. A finite generating set of $\Gamma_2(n)$ has been known. In our work, we obtained a finite presentation of $\Gamma_2(n)$. To obtain a presentation, we constructed a simply connected simplicial complex which $\Gamma_2(n)$ acts on. In this talk, we will introduce this complex. We note that a presentation of $\Gamma_2(n)$ has been independently obtained also by Fullarton and Margalit-Putman recently. As an application, we obtained a generating set of the Torelli group of a non-orientable closed surface. We will also talk about it.