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Daniel Kalmanovich* (dannikal@bgu.ac.il), **Mikhail Klin** and **Sven Reichard**. *Some transitive actions of groups $\mathrm{PSL}(2, p)$ and related discrete structures*. Preliminary report.

This project was originated by Eran Nevo together with the late William Thurston. A special tiling of a suitable hyperbolic space by octahedra was considered, producing a simplicial complex X with $v = \frac{p^2-1}{4}$ vertices, $e = \frac{p(p^2-1)}{8}$ edges and $t = \frac{p(p^2-1)}{6}$ triangles, such that $\mathrm{PSL}(2, p)$ acts transitively on partial flags of X , here $p \equiv 1 \pmod{4}$. In fact, the existence of X can be proved independently relying on the classical results by L. E. Dickson: the complete classification of the subgroups of the simple groups $\mathrm{PSL}(2, p)$, p prime. From X we can construct an association scheme \mathcal{M} of order v and a partially balanced incomplete block design. The automorphism group $\mathrm{Aut}(\mathcal{M})$ contains a transitive action of $\mathrm{PSL}(2, p)$ of degree v . The considered class of actions of $\mathrm{PSL}(2, p)$ was used by R. Mathon for the construction of a wide class of antipodal covers of complete graphs, i.e., imprimitive distance regular graphs of diameter 3. This kind of transitive actions of the groups $\mathrm{PSL}(2, p)$ can be considered in a wider framework. Intensive computer algebra experimentation (by MK and SR) yielded a new family of non-Schurian imprimitive association schemes with 3 classes. (Received September 04, 2012)