A Hypergraph with Commuting Partial Laplacians

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Abstract. Let $F$ be a totally real number field and let $GL_n$ be the general linear group of rank $n$ over $F$. Let $p$ be a prime ideal of $F$ and $F_p$ the completion of $F$ with respect to the valuation induced by $p$. We will consider a finite quotient of the affine building of the group $GL_n$ over the field $F_p$. We will view this object as a hypergraph and find a set of commuting operators whose sum will be the usual adjacency operator of the graph underlying the hypergraph.