HECKE EIGENFORMS IN THE COHOMOLOGY OF CONGRUENCE SUBGROUPS OF SL$(3, \mathbb{Z})$

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Abstract. We list here Hecke eigenvalues of several automorphic forms for congruence subgroups of SL$(3, \mathbb{Z})$. To compute such tables, we describe an algorithm that combines techniques developed by Ash, Grayson and Green with the Lenstra–Lenstra–Lovász algorithm. With our implementation of this new algorithm we were able to handle much larger levels than those treated by Ash, Grayson and Green and by Top and van Geemen in previous work. Comparing our tables with results from computations of Galois representations, we find some new numerical evidence for the conjectured relation between modular forms and Galois representations.