A TEST FOR IDENTIFYING FOURIER COEFFICIENTS OF AUTOMORPHIC FORMS AND APPLICATION TO KLOOSTERMAN SUMS

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ABSTRACT. We present a numerical test for determining whether a given set of numbers is the set of Fourier coefficients of a Maass form, without knowing its eigenvalue. Our method extends directly to consideration of holomorphic newforms. The test is applied to show that the Kloosterman sums $\pm S(1,1;p)/\sqrt{p}$ are not the coefficients of a Maass form with small level and eigenvalue. Source code and the calculated Kloosterman sums are available electronically.