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**Paul Jenkins\*** (jenkins@math.byu.edu) and **Jeremy Rouse**. *Bounds for coefficients of cusp forms and extremal lattices.*

A cusp form  $f(z)$  of weight  $k$  for  $\mathrm{SL}_2(\mathbb{Z})$  is determined uniquely by its first  $\ell := \dim S_k$  Fourier coefficients. We derive an explicit bound on the  $n$ th coefficient of  $f$  in terms of its first  $\ell$  coefficients. We use this result to study the non-negativity of the coefficients of the unique modular form of weight  $k$  with Fourier expansion

$$F_{k,0}(z) = 1 + O(q^{\ell+1}).$$

In particular, we show that  $k = 81632$  is the largest weight for which all the coefficients of  $F_{k,0}(z)$  are non-negative. This result has applications to the theory of extremal lattices. This is joint work with Jeremy Rouse. (Received August 01, 2011)