1031-14-128 **Milena Hering** and **Benjamin James Howard*** (howardbj@umich.edu), Mathematics Department, University of Michigan, 530 Chruch Street, Ann Arbor, MI 48109. *A nice projective embedding for the geometric invariant theory quotients* $(\mathbb{P}^1)^n//SL_2$.

Given an n-tuple $\mathbf{w} = (w_1, \ldots, w_n)$ of positive integers, we study the moduli space $M_{\mathbf{w}}$ of weighted n-tuples of points on the projective line, modulo automorphisms of the line. The space $M_{\mathbf{w}}$ is obtained as a geometric invariant theory quotient of $(\mathbb{P}^1)^n$ by SL_2 using the line bundle $L_{\mathbf{w}} = O(w_1, \ldots, w_n) = O(w_1) \boxtimes \cdots \boxtimes O(w_n)$ over $(\mathbb{P}^1)^n$. The projective variety $M_{\mathbf{w}}$ has an explicit embedding into projective space.

We find that if each w_i is an even integer, the projective coordinate ring $R_{\mathbf{w}}$ of $M_{\mathbf{w}}$ is particularly nice. The ideal of $R_{\mathbf{w}}$ admits a quadratic Gröbner basis. Further, if each $w_i = 2$ then $R_{\mathbf{w}}$ is Gorenstein, and $M_{\mathbf{w}}$ is a Fano variety.

All of these results are obtained by degenerating $R_{\mathbf{w}}$ into a toric algebra $R'_{\mathbf{w}}$. The ideal of $R'_{\mathbf{w}}$ also has a quadratic Gröbner basis, and $R'_{\mathbf{w}}$ is Gorenstein when each $w_i = 2$. (Received August 07, 2007)