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Alison Beth Miller* (alimil@umich.edu). *Asymptotics for $\mathrm{Sp}_{2g}(\mathbb{Z})$ -orbits on $2g$ -ary quadratic forms.*

We use geometry of numbers to give a weighted asymptotic count for the number of orbits of the symmetric square of the standard representation of $\mathrm{Sp}_{2g}(\mathbb{Z})$. That is, we count $2g$ -ary quadratic forms up to $\mathrm{Sp}_{2g}(\mathbb{Z})$ -equivalence. Our results generalize the classical results of Gauss-Mertens-Siegel on binary quadratic forms, and they can also be generalized further to count integral orbits of the adjoint representation of any semisimple algebraic group. We show that the number of positive definite orbits with invariant height $\leq X$ is asymptotic to $X^{g(2g+1)}$, and give the analogous result weighted by regulators in the indefinite case. (Received January 13, 2020)