Practical computations with indefinite forms

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An indefinite lattice is a integral valued quadratic form on $\mathbb{Z}^n$ of signature (p, q) with $p, q > 0$. We consider following problems for them:

1. Compute a generating set of the group of inversible integral transformations preserving q.
2. Given two forms A_1 and A_2 test if there is an inversible integral transformation ϕ such that $A_2[x] = A_1[\phi(x)]$.
3. Given $C \neq 0$ find the orbit representatives of solutions of $A[x] = C$.
4. Find the orbit representatives of solutions of $A[x] = 0$ with x primitive.
5. For $k \geq 2$ find the orbit representatives of totally isotropic k-dimensional spaces (and also flags).

We provide some methods that allow to resolve such questions. This is based on polyhedral, lattice, group theoretic techniques.

If time allows, I will report on related techniques of fundamental domains and hyperbolic Coxeter groups.