

Theorem. (Theorem 2.1 in [Vin3])

Let $G = \{g_{ij}\}$ be an indecomposable symmetric matrix of signature $(d, 1)$ with units on the diagonal and non-positive off-diagonal elements everywhere else. Then there exists a convex polytope P in d -dimensional hyperbolic space \mathbb{H}^d such that the Gram matrix $G(P)$ of P coincides with G . The polytope P is unique up to isometry of \mathbb{H}^d .

[Vin3] E. B. Vinberg, *Hyperbolic reflection groups*, Russian Math. Surveys 40 (1985), 31–75.