

Problem Set 8
CSE 599S - Lattices
Winter 2023

Exercise 4.4 (10pts)

Prove the following (which is a generalization of what we have seen earlier): For any full rank lattice Λ and any symmetric convex body $K \subseteq \mathbb{R}^n$ one has $\mu(\Lambda, K) \geq \frac{1}{2} \lambda_n(\Lambda, K)$.

Exercise 4.5 (10pts)

Prove the Shifted Poisson Summation Formula: For a nice enough function $f : \mathbb{R}^n \rightarrow \mathbb{C}$, a full rank lattice $\Lambda \subseteq \mathbb{R}^n$ and a vector $\mathbf{s} \in \mathbb{R}^n$ one has $\sum_{\mathbf{x} \in \Lambda} \exp(2\pi i \langle \mathbf{x}, \mathbf{s} \rangle) \cdot f(\mathbf{x}) = \det(\Lambda^*) \cdot \hat{f}(\Lambda^* - \mathbf{s})$.