CO 789, Homework 1

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1 First section

Definition 1.1 (Lattice)**.** *A lattice is a discrete subgroup of* $\mathbb{R}^n$

Theorem 1.1 (Minkowski's bound)**.** *let* $\mathcal{L}(B)$ *be a full-rank lattice with basis* $B \in \mathbb{R}^{n\times n}$*, and* $B^* = [\mathbf{b}_1^*, \mathbf{b}_2^*, \ldots, \mathbf{b}_n^*]$ *be the Gram-Schmidt orthogonalization of* B*, then*

$$\lambda_1(\mathcal{L}(B)) \geq \min_{1\leq i\leq n} \|\mathbf{b}_i^*\| \tag{1}$$

Algorithm 1: Euclid's algorithm

Data: Two positive integers a and b
Result: The greatest common divisor of a and b
while $b \neq 0$ **do**
    $r \leftarrow a \mod b$;
    $a \leftarrow b$;
    $b \leftarrow r$;
end
return a;