Iskander Aliev* (alievi@cf.ac.uk), School of Mathematics, Cardiff University, Cardiff, CF24 4AG, United Kingdom. Lattice programming gaps, circulant graphs and Frobenius numbers.

Given a full-dimensional lattice $\Lambda \subset \mathbb{Z}^k$ and a cost vector $l \in \mathbb{Q}^k_{>0}$, we are concerned with the family of the group problems

$$\min\{l \cdot x : x \equiv r \mod \Lambda, x \geq 0\}, \quad r \in \mathbb{Z}^k.$$ 

The lattice programming gap $\text{gap}(\Lambda, l)$ is the largest value of the minima above as $r$ varies over $\mathbb{Z}^k$. We show that computing the lattice programming gap is NP-hard when $k$ is a part of input. We also obtain lower and upper bounds for $\text{gap}(\Lambda, l)$ in terms of $l$ and the determinant of $\Lambda$. The proofs are build on a relation between the group problems, circulant graphs and Frobenius numbers. (Received August 28, 2014)