Algebraic and Geometric Methods in Engineering and Physics

Homework 4

Due on October 19

1. Find a decryption exponent d corresponding to the encryption exponent $e = 7$ in $\mathbb{Z}_{187}$.

2. List all abelian groups of order 36 (up to isomorphism), and in each case give an element of maximal order.

3. Consider the action of $\mathbb{R}$ on $\mathbb{C}$ given by $\varphi_t(z) = e^{it}z$. Determine if this action is effective and/or transitive, and compute the set of orbits $\mathbb{C}/\mathbb{R}$, the set of fixed points $\mathbb{C}^{\mathbb{R}}$, the stabilizer of the set $X = \{1, -1, i, -i\}$ and the isotropy subgroups $\mathbb{R}_z$ for all $z \in \mathbb{C}$.