

# Homework #1

Assigned: 6.10.2021

Due: 20.10.2021

## Factor group (7 points)

Multiplication table of a 6-element group is

E	A	B	C	D	F
A	E	D	F	B	C
B	F	E	D	C	A
C	D	F	E	A	B
D	C	A	B	F	E
F	B	C	A	E	D

1. Find all nontrivial normal subgroups. Choose one of them and verify explicitly that corresponding left and right cosets are identical.
2. Construct the multiplication tables of the respective factor groups.

## Direct product group (13 points)

1. Show that the point group  $D_6$  generated by the six-fold rotation around the  $\langle z \rangle$ -axis and two-fold rotation around the  $\langle x \rangle$ -axis is isomorphic to the direct product group  $D_3 \otimes C_2$ .
2. Find the conjugation classes for all the groups  $D_6$ ,  $D_3$  a  $C_2$ .
3. Evaluate the class constants for  $D_3$