KTH Computer Science
and Communication

A summary of Groups and Rings SF2729

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Abstract

This paper contains a brief summary of the course Groups and Rings which is given at KTH in Stockholm. The basis for this is the book: A First Course In Abstract Algebra by John B. Fraleigh.

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Chapter 1

Definitions

1.1 Structures

1.1.1 Set

1.1.2 Group

1.1.3 Ring

1.1.4 Field

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1.2.3 Ideal

1.3 Relations between structures

1.3.1 Homomorphism

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Chapter 2

Useful theorems

2.1 LOREM IPSUM

2.1.1 Lagrange's Theorem

2.1.2 Cauchy's Theorem

Chapter 3

Misc. Later put into some of the above chapters

3.0.3 Equivalence relation $\mathfrak{R}$

$$\mathfrak{R} \text{ is an equivalence relation on a set } \mathcal{S}$$
$$\Leftrightarrow$$

$$\begin{cases} x\mathfrak{R}x \\ x\mathfrak{R}y \Rightarrow y\mathfrak{R}x \\ x\mathfrak{R}y \wedge y\mathfrak{R}z \Rightarrow x\mathfrak{R}z \end{cases} , \forall x, y, z \in \mathcal{S} \tag{3.1}$$

3.0.4 Binary operations $*$

$$\begin{aligned} * : \mathcal{S} \times \mathcal{S} &\to \mathcal{S} \\ (x, y) &\mapsto *((x, y)) = x * y \end{aligned} \tag{3.2}$$

The binary function $*((x, y))$ is denoted by $x * y$.

Closed under *

Commutative

Associative

$$(a * b) * c = a * (b * c) \tag{3.3}$$

Which gives us