Galois Theory: GAL #05

Due on Mar 18, 2022 at 11:59pm

Prof Matyas Domokos Section 7

Xianzhi

2023

HW05
Exercise 7.2.5
Exercise 7.2.7
Exercise 7.2.8

Problem 1

Exercise 7.2.5 Let $\gamma = \sqrt{2+\sqrt{2}}$.

1. Show that $\mathbb{Q}(\gamma) : \mathbb{Q}$ is normal with cyclic Galois Group.

2. Show that $\mathbb{Q}(\gamma, i) = \mathbb{Q}(\phi)$ with $\phi^4 = i$.

Soln:

Problem 2

Exercise 7.2.7 Find the degree of

$$\sqrt[5]{81} + 29\sqrt[5]{9} + 17\sqrt[5]{3} - 16 \tag{1}$$

over $\mathbb{Q}$.

Soln:

Problem 3

Exercise 7.2.8 Find the degree of $\sqrt[5]{81}$ over $\mathbb{Q}(\sqrt[81]{5})$.
Soln: