Field extensions

Let E be a field and $F \subset E$ be a subfield. We also say that E is an extension field of F. Often, we simply say E is an extension of F. Either

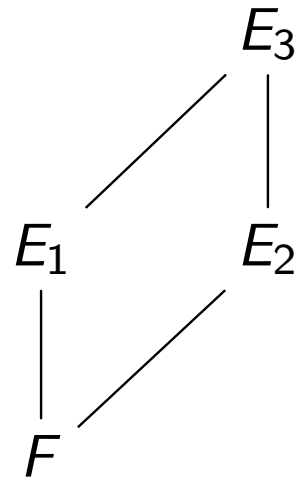
$$E/F$$

or

$$\begin{array}{c} E \\ | \\ F \end{array}$$

denotes an extension.

Diagrams like



are useful.

If E is an extension of F, then E is a vector space over F.

Definition

A finite extension of F is an extension E/F which is finite dimensional over F.

Question

Is $\mathbb{C}/\mathbb{Q}$ finite? What about $\mathbb{C}/\mathbb{R}$?