2. Modules (continued)

More on modules

Sums of modules

Suppose that R is a ring and M is an R-module. Let $N_1, \ldots, N_k$ be submodules of M. Then the sum $N_1 + \ldots + N_k$ is the collection

$$N_1 + \ldots + N_k = \{n_1 + \cdots + n_k : n_i \in N_i$$

It is a submodule of M and the smallest submodule containing all the N_i.

One can also consider infinite collections of submodules:

$$\sum_{i \in I} N_i = \{\sum_{j \in J} n_j : n_j \in N_j, J \subset I \text{ finite } \}$$

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