

Problem 1. Gathmann exercise 5.11.

Problem 2. Let R be a ring.

1. Let $\{M_i\}_{i \in I}$ a collection of R modules. Show that $\bigoplus_{i \in I} M_i$ is flat if and only if M_i is flat for all $i \in I$.
2. Show that if P is a projective R module, then P is flat.
3. Find a flat module N over some ring that is not projective.

Problem 3. Gathmann exercise 6.12.

Problem 4. Gathmann exercise 6.24.

Problem 5. Gathmann exercise 6.29.