

MAT402 HW3

These are practice problems.

Problem 1. Show that the tangent bundle TS^1 of S^1 is isomorphic to the trivial real line bundle over S^1 .

Problem 2. Show that the tautological line bundle $\gamma_n \rightarrow \mathbb{R}P^n$ is non-trivial for $n \geq 1$.

Problem 3. Let $f : M \rightarrow N$ be a smooth map and $V \rightarrow N$ a vector bundle. Show that:

- (i) if $V \rightarrow N$ is a trivial line bundle, then so is $f^*V \rightarrow M$;
- (ii) $f^*V \rightarrow M$ may be trivial even if $V \rightarrow N$ is not.