

Definition 1. Let M_1, M_2 be two submanifolds of a manifold X . Then the intersection $M_1 \cap M_2$ is transverse if for all $p \in M_1 \cap M_2$

$$T_p M_1 + T_p M_2 = T_p X.$$

We have the following

Proposition 2. Let M_1, M_2 be smooth submanifolds of X that intersect transversely. Then $M_1 \cap M_2$ is a smooth submanifold of X .

Proof. The proof is essentially just the implicit function theorem. \square