

THE ORTHOGONAL GROUP AS A MANIFOLD

Let $O(n)$ be the group of $n \times n$ real matrices X with $XX^T = \text{Id}_n$.

Problem 16. Show that there is an open set $U \ni \text{Id}_n$ such that $U \cap O(n)$ is a manifold.

Problem 17. Compute $T_{\text{Id}_n} O(n)$.

Problem 18. Show that $O(n)$ is a manifold. (Hint: Use that $O(n)$ is a group!)