

HOMWORK 24

Note: * marked problems might be slightly more difficult or interesting than the unmarked ones.

- (1) Show that having the same homotopy type is an equivalence relation.
- (2) Show that there is no covering map from \mathbb{R}^2 to S^2 .
- (3) Show that if a space X deformation retracts to a point $x \in X$, then for each neighborhood U of x in X , there exists a neighborhood $V \subseteq U$ of x such that the inclusion map $V \hookrightarrow U$ is null homotopic.
- (4) Topology (Munkres), Chapter 9, Section 58, Exercise (1).
- (5) Topology (Munkres), Chapter 9, Section 58, Exercise (4).
- (6)* Topology (Munkres), Chapter 9, Section 58, Exercise (8).
- (7) Topology (Munkres), Chapter 9, Section 58, Exercise (9).