

TOPOLOGY 2, HOMEWORK 4

- (1) Hatcher, Chapter 0, #3
- (2) Hatcher, Chapter 0 #5
- (3) Hatcher, Chapter 0 #6(a),(b)
- (4) Hatcher, Section 1.1 #5
- (5) Hatcher, Section 1.1 #7
- (6) Hatcher, Section 1.1 #16

Here the **wedge sum** $X \vee Y$ of spaces X and Y with fixed basepoints $x_0 \in X$ and $y_0 \in Y$ is the identification space $X \sqcup Y / \sim$, where $x_0 \sim y_0$ and this is the only equivalence class of the relation \sim with more than one element. See p. 10 of Hatcher's Chapter 0.

(The choice of basepoints is suppressed in the notation because it often does not matter. For instance suppose X and Y are *homogeneous* in the sense that for any $x, x' \in X$ there is a homeomorphism of X taking x to x' , and similarly for Y (eg. if $X = Y = S^1$). Then for any $x_0, x'_0 \in X$ and $y_0, y'_0 \in Y$, the wedge sum $X \vee Y$ obtained by setting $x_0 \sim y_0$ is homeomorphic to the one obtained by setting $x'_0 \sim y'_0$.)