

TOPOLOGY 2 - HOMEWORK 8

- (1) Midterm problem 3(b) (first do 3(a), if you missed it).
- (2) For a collection $\{v_0, \dots, v_n\} \subset \mathbb{R}^m$ in general position, ie, so that the n vectors $v_1 - v_0, \dots, v_n - v_0$ are linearly independent, prove that

$$[v_0, \dots, v_n] = \left\{ \sum_{i=0}^n t_i v_i \mid t_i \geq 0 \text{ for all } i, \text{ and } \sum_{i=0}^n t_i = 1 \right\}$$

Hint: This follows from two facts:

- (a) The right-hand set above is convex, and
- (b) it is contained in every convex set containing $\{v_0, \dots, v_{n-1}\}$

Fact (a) can be verified directly, and (b) by induction.

- (3) Hatcher, Section 2.1, Exercise 3.
- (4) Hatcher, Section 2.1, Exercise 4.
- (5) Hatcher, Section 2.1, Exercise 7.