Assignment 4

- 1. Give the interior and relative interior of the following sets:
- (1) $I^2 := \{(x, y, 0) \mid 0 \le x, y \le 1\};$
- (2) $I^3 := \{(x, y, z) \mid 0 \le x, y, z \le 1\}.$

2. Determine whether the following assertions are true. Give a proof if it is true and give a counter-example if not.

- (1) If $T \subset S$, then $int(T) \subset int(S)$;
- (2) If $T \subset S$, then $\operatorname{ri}(T) \subset \operatorname{ri}(S)$;

3.

- (1) State the Hyperplane Separation Theorem and the Hyperplane Proper Separation Theorem.;
- (2) Explain why the boundedness condition in corollary 2.1 in the lecture note can not be removed.