

18.952 Problem set #3
(due Wednesday, March 2)

1. (a) Let V be an n -dimensional vector space and ω an element of $\Lambda^k(V^*)$. Define a k -tensor $A\omega \in \mathcal{L}^k(V)$ by setting

$$A\omega(v_1, \dots, v_k) = \iota_{v_k} \cdots \iota_{v_1} \omega.$$

Show that A is alternating.

- (b) Show that the map,

$$\omega \rightarrow \frac{1}{k!} A\omega$$

is the inverse of the projection map $\pi : \mathcal{A}^k(V) \rightarrow \Lambda^k(V^*)$.

2. §1.9, problems 4, 11, 12*.
3. §2.1, problems 1, 2, 3.