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Math142 FA19
Reading Summary 1
Due: Mon, Sep 16, 2019

I read Sections 2.1.1-2.1.4, 2.1.6, 3.1.1- 3.1.5.

Below I comment of what I consider highlights from each section. I stop when 1 page is reached.

- Section 2.1.1
  - Homogeneous coordinates allow for an elegant representation of the solution of two equations in two unknowns
    $$\tilde{x} = \tilde{l}_1 \times \tilde{l}_2$$
  - Homogeneous coordinates allow for an elegant representation of the line passing through a pair of points
    $$\tilde{l} = \tilde{x}_1 \times \tilde{x}_2$$
- Section 2.1.2
  - The action of a projective transformation on a co-vector such as a 2-D line or a 3-D normal can be represented by teh transposed inverse of the matrix, which is equivalent to the adjoint of $\tilde{H}$, since projective transformation matrices are homogeneous.
    $$\tilde{l}_{output} = \tilde{H}_{-T} \times \tilde{l}_{input}$$
  - Hieracrchy of 2-D transformations gives the relationship between different geometries based on the sub-group relationship. This is Klien's erlangen program.
- Section 2.1.3
  - Hieracrchy of 3-D transformations gives the relationship between different geometries based on the sub-group relationship. Again Klien's erlangen program.
- Section 2.1.4
  - Two primary representations of the group of 3-D rotations are presented. The Axis/angle representation with Rodriguezs formula being the highlight. The unit quaternion representation which has the atractive property of being continuous.