1 Logistics

Next meeting: Friday March 22, 9:30 - 11am

Expectations for next meeting:

- mountain / valley labellings for hexagon crease pattern

  Problem 9: In a diagram with 6 creases coming together at a vertex at equal angles, the unit null cone near the flat space is two disjoint spheres. We consider cutting up these spheres into regions according to mountain/valley labellings.

  (a) How many zero-dimensional, one-dimensional, and two-dimensional regions are there on each sphere?

  (b) What shapes are the two-dimensional regions? How do they fit together? (i.e. draw out a diagram)

- area formula for spherical n-gons

  Problem 10: For a spherical n-gon with internal angles $\alpha_1, \ldots, \alpha_n$, show that

  $$\text{Area} = \sum_{i=1}^{n} \alpha_i - (n-2)\pi$$

  where area is measured on the surface of a unit sphere. Equivalently, for an n-gon

  $$\text{Area} = 2\pi - \sum_{i=1}^{n} (\pi - \alpha_i).$$

  You may assume the triangle area formula Area $= (\alpha_1 + \alpha_2 + \alpha_3) - \pi$.

- angle constraints on hexagon crease patter

  Problem 11: Suppose we want to fix three consecutive creases on a hexagon at fold angles θ_1, θ_2, and θ_3. (By "fold angle" we mean flat $\Leftrightarrow$ $\theta_i = 0$.)

  (a) When is this possible, and when is this impossible?

  (b) When this is possible, what are the values of angles θ_4, θ_5, θ_6? Note: there may be more than one answer. How many answers are possible?

  For example,

  - if $\theta_1 = \theta_2 = \theta_3 = 0$, then this is possible and we must have $\theta_4 = \theta_5 = \theta_6 = 0$.
  - if $\theta_1 = \theta_2 = 0$ and $\theta_3 = \pi$, then this is possible and we must have $\theta_4 = \theta_5 = 0$ and $\theta_6 = \pi$.

- **[Writing]** Write up notes for this meeting, and continue writing up relevant discussion from this week in draft of final report