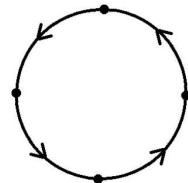


MAT 4002 Homework 7

1. We have seen that if a continuous, surjective map $f : X \rightarrow Y$ maps open sets to open sets, then it is a quotient map.

Consider the projection map $p : [0, 1] \times [0, 1] \rightarrow M := [0, 1] \times [0, 1] / \sim$, where M is the Möbius band. Show that it is a quotient map, but it does not map open sets to open sets (you can draw a picture for explanations).

2. Show that the quotient space of S^1 given by the diagram below is homeomorphic to S^1 :



(Hint: Construct a continuous, 4-to-1 surjective map $f : S^1 \rightarrow S^1$). Can you give some other examples of S^1 / \sim that are also homeomorphic to S^1 ?

3. Find a triangulation of the following space (the 'dunce hat'):

