MITRO207-2018
Homework 2

Problem 1: connected graphs

Consider a simplicial map φ from a graph $\mathcal{G}$ to a graph $\mathcal{H}$. Prove that if $\mathcal{G}$ is connected, so is the image $\varphi(\mathcal{G})$.

Let Φ be a carrier map from $\mathcal{G}$ to $\mathcal{H}$. Show that it is not *always the case that if $\mathcal{G}$ is connected, then $\Phi(\mathcal{G})$ is connected. Show that if $\mathcal{G}$ is connected and, for every edge $\sigma \in \mathcal{G}$, $\Phi(\sigma)$ is connected, then $\Phi(\mathcal{G})$ is connected.*

Problem 2: map compositions

Prove that a composition of two simplicial maps is a simplicial map. Prove that if both maps are rigid, so is their composition.

Problem 3: carrier compositions

Define the composition of a carrier map followed by a simplicial map. Prove that the composition is a carrier map. Moreover, if both maps are chromatic, then their composition is chromatic.