Fall 2021, Math 596: Week 7 Preliminary Problems
Due: Thursday, October 7th, 2021
Faces of Polyhedra

Preliminary problems. These problems should be completed before discussion on Thursday.

(P1) Draw the polytope

$$P = \text{conv}\{(0,0,0),(1,0,0),(0,1,0),(1,1,0),(0,0,1)\} \subset \mathbb{R}^3.$$

(P2) Write down an inequality $a_1x_1 + a_2x_2 + a_3x_3 \leq b$ that defines a half-space demonstrating $\emptyset$ is a face of P.

(P3) Write down an inequality $a_1x_1 + a_2x_2 + a_3x_3 \leq b$ that defines a half-space demonstrating P is a face of P.

(P4) Write down each subset of the vertices of P whose convex hull is a face of P.

Note: there are 20 faces total.