Trajectory following - MEAM 6200, Project 1.3

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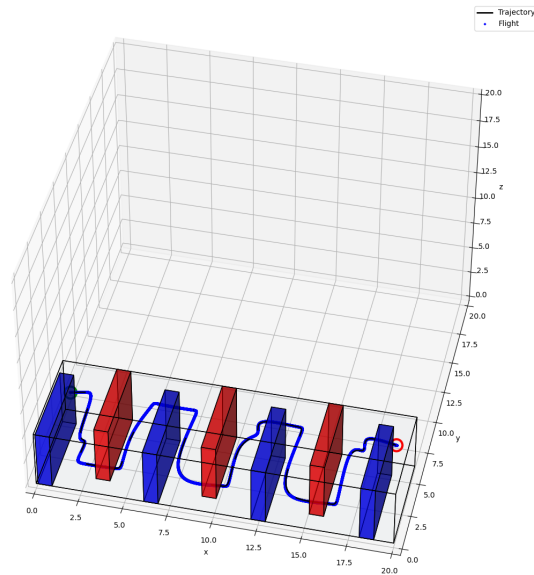

Figure 1: Custom world map with obstacles with trajectory

1 Enhancements from previous projects

- **Path Simplification with Douglas-Peucker Algorithm:** I used this algorithm to cut down the number of waypoints while keeping the path's shape intact. It works by finding and keeping only the most important points along the route.

- **Dynamic Velocity Control:** I created a speed system that changes based on how far apart the waypoints are. The drone slows down at the beginning and end.

- **Better Trajectory Smoothing:** I switched from polynomials to cubic splines for creating the flight path. This makes the drone's movement between points much smoother and more natural.

2 Resolution and Margin

For the map resolution and margin parameters, I chose: **Resolution:** [0.2, 0.2, 0.2], **Margin:** 0.6
I picked this resolution because it is detailed enough to navigate tricky environments but isn't so detailed that it slows down the calculations too much. For the safety margin, I considered how big the drone is and how much the drone might drift during flight. Finding the right balance between playing it safe and still being able to fit through tight spaces.