Motor thrust testing:

1 Motor Thrust Testing

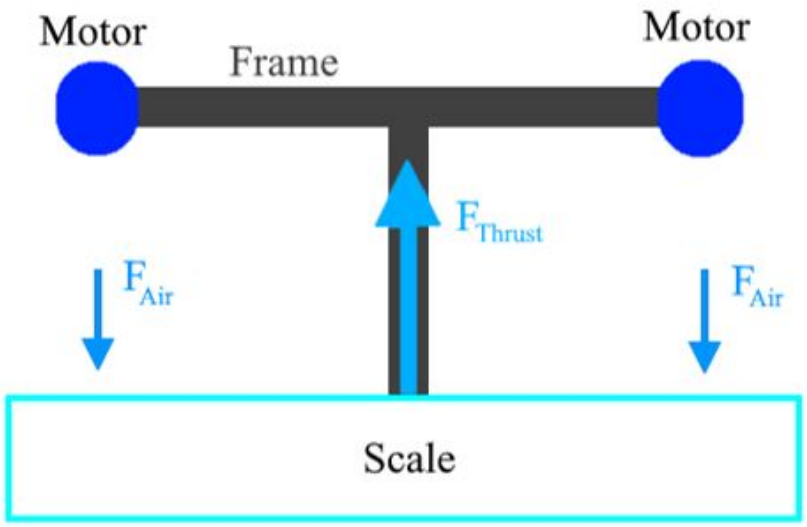
The 4th semester project in mechatronics is based on building a VTOL drone. For the drone to take flight, sufficient thrust provided by the propellers attached to the motors of the drone is required. Thus, the following is the report of thrust testing using different motors and propellers. Initial testing setup

1.1 Assumptions

The initial idea to test the thrust provided by a certain motor was to create a x-shaped frame where, the motors were connected to their respective corners and a bolt was tightened in the centre as a means of weight. The frame with the motors were then placed on a scale where the motors were facing in the direction of the ceiling, thus meaning that propellers were pushing the air downwards and the setup upwards. The initial weight of the frame was then noted, where after powering up the motors, the weight of the setup would decrease due to the thrust.

1.2 Results

The setup of the bolt supporting the frame on the scale was unstable, and because of that the wiring of the motors had also interfered with the weight. Additionally, as the propellers were pushing the frame with a certain thrust force, the air that was being pushed down also had the same force. Therefore, as the frame was very close to the scale, the force by which the setup was being lifted by was also being pushed down by the air on the scale, thus making almost no changes on the scale readings.



$$4 \cdot F_{Thrust} \approx 4 \cdot F_{air}$$

Figure 1: Initial Thrust Setup