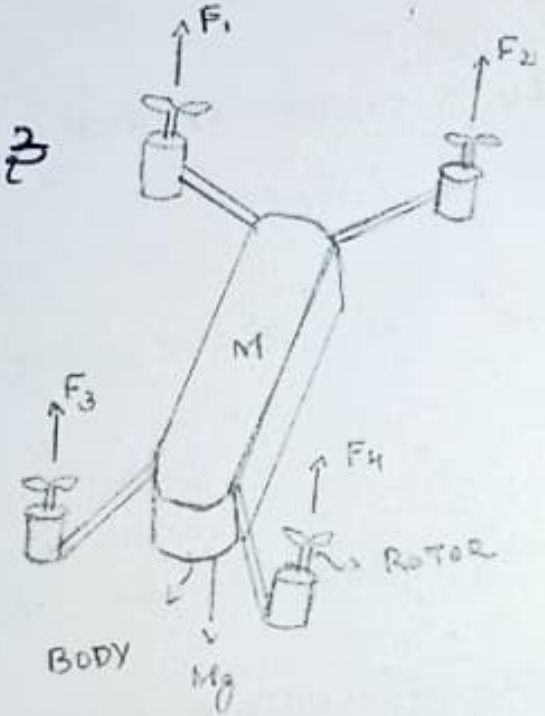
Task 2



Four Types of Quadcopter Movements

1) Hovering

The Drone stays at equilibrium position

$\sum_{i=0}^{4} F_i = Mg$: condn

2) Yaw

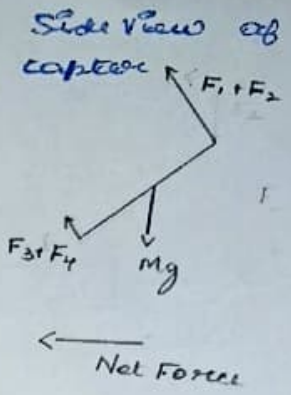
The Drone rotates around its own axis

condn:

All Motors Rotate along same direction so that the body produce counter Torque in opposite direction

Pitch

The copter moves in forward direction

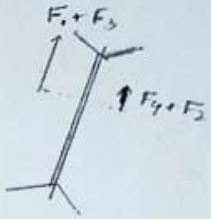


- condn: (Forward Pitch)

$(F_1 + F_2) > F_3 + F_4$

Roll

The copter rolls in sideward direction



cond: (Clockwise Pitch)

$F_1 + F_3 > F_4 + F_2$

b) If one Motor is damaged ($F_4 = 0$)

Condns are

Hovering : $F_1 + F_2 + F_3 = Mg$

Yaw : Not possible (So copter starts to spin)

Pitch :

Forward

$F_1 + F_2 > F_3$

Backward

$F_1 + F_2 < F_3$

- If all 3 Motors are similar, then this is only possible if F_1 & F_2 are speeds are lowered and F_3 is Max

Roll:

Clockwise

$F_1 + F_3 > F_2$

Anticlockwise

$F_1 + F_3 < F_2$

- F_1 & F_3 speeds should be lower F_2 speed should be Maxed