KIDOBOTIKZ

Engineering Real Engineers

EXPERT LEVEL

NOTES

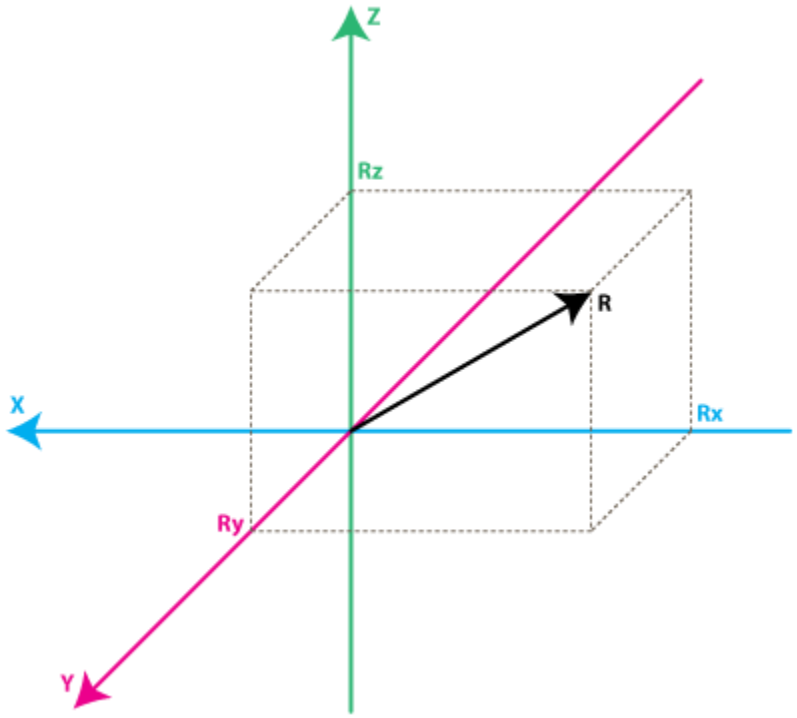
(LEVEL 10)

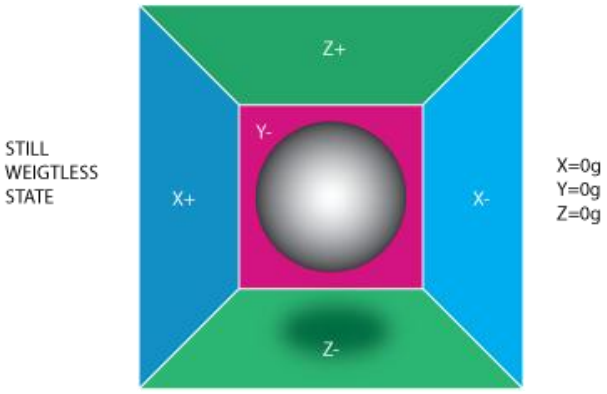
Date:

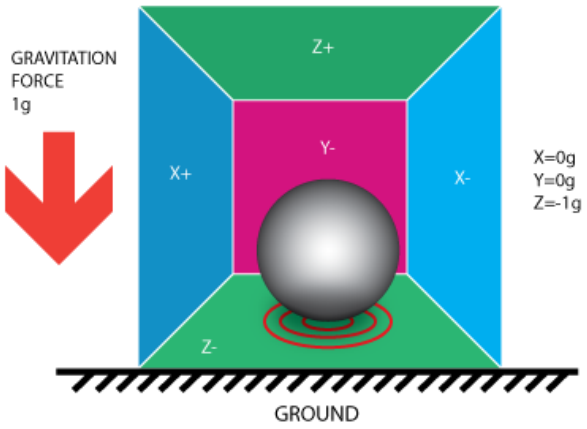
Accelerometer:

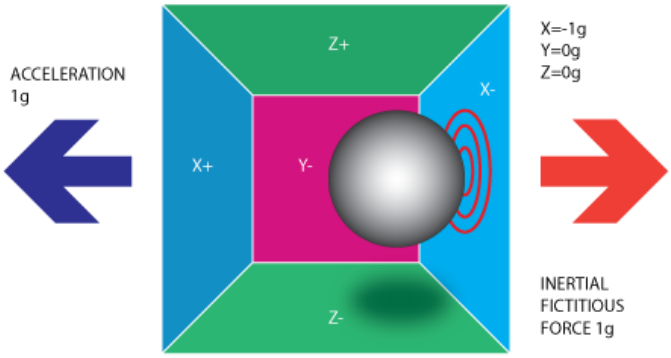
An accelerometer measures the acceleration due to gravity. In outer space (where there is no gravity) the accelerometer gives an output O. However on earth, when in rest on ground, it gives an output equal to acceleration due to earth's gravity.

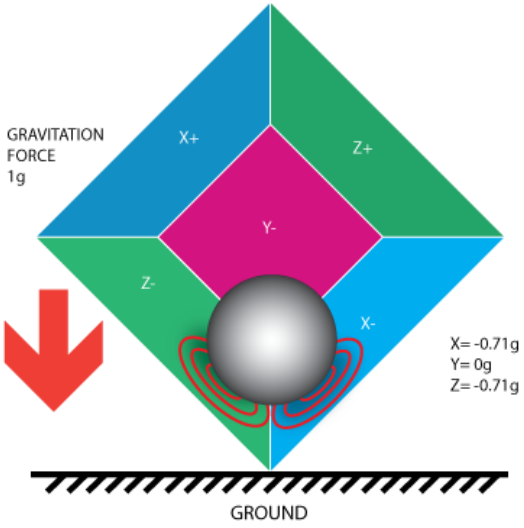
As far as the application is considered, it is used to measure and find the angle in which an object is present.




STILL
WEIGTLESS
STATE
Z+
Y-
X+
X-
Z-
X=0g
Y=0g
Z=0g


GRAVITATION
FORCE
1g
Z+
Y-
X+
X-
Z-
X=0g
Y=0g
Z=-1g
GROUND


ACCELERATION
1g
Z+
X-
X+
Y-
Z-
X=-1g
Y=0g
Z=0g
INERTIAL
FICTITIOUS
FORCE 1g


GRAVITATION
FORCE
1g
X+
Z+
Y-
Z-
X-
X= -0.71g
Y= 0g
Z= -0.71g
GROUND

Choosing an accelerometer requires two criteria: Number of axis of measurement and the grams.

The grams can be compared to the weight of the ball. As the weight increases, the response of measurement decreases (as the ball will take a longer time to move) but the values will be stable (as there is no frequent changes in the ball movement). However as the weight decreases, the ball keeps moving for even minute movements giving great response.

GYROSCOPE:

A mechanical gyroscope provides a force against the force that pulls it out of the position kept. An electronic gyroscope provides the value of the force exerted on it with which we can use some other external mechanism to provide a reaction force opposite to it.

Date:

Haptic-controlled wheeled robot:

Concept:

Based on the hand position, the robot should move.

Hand in stable-flat position: Robot stops

Hand bent forward: Robot moves forward

Hand bent backward: Robot moves backward

Hand bent leftward: Robot turns left

Hand bent rightward: Robot turns right

Program:

```
int m1t1=5,m1t2=6,m2t1=10,m2t2=11,accx=A0, accy=A1;
int x,y;
void setup( )
{
        pinMode(m1t1,OUTPUT);
        pinMode(m1t2,OUTPUT);
        pinMode(m2t1,OUTPUT);
        pinMode(m2t2,OUTPUT);
        pinMode(accx,INPUT);
        pinMode(accy,INPUT);
        pinMode(accz,INPUT);
}
void loop( )
{
        x=digitalRead(accx);
        y=digitalRead(accy);
```

```
        if(x<300)
        {
        analogWrite(m1t1,0);
        analogWrite(m1t2,255);
        analogWrite(m2t1,255);
        analogWrite(m2t2,0);
        }
        else if(x>400)
        {
        analogWrite(m1t1,255);
        analogWrite(m1t2,0);
        analogWrite(m2t1,0);
        analogWrite(m2t2,255);
        }
        else if(x>300 && x<400)
        {
        analogWrite(m1t1,0);
        analogWrite(m1t2,0);
        analogWrite(m2t1,0);
        analogWrite(m2t2,0);
        }
        if(y>300)
        {
        analogWrite(m1t1,0);
        analogWrite(m1t2,255);
        analogWrite(m2t1,0);
        analogWrite(m2t2,255);
        }
        else if(y>400)
        {
        analogWrite(m1t1,255);
        analogWrite(m1t2,0);
        analogWrite(m2t1,255);
        analogWrite(m2t2,0);
        }
}
```

Date:

Accelerometer based Stabilization platform:

Concept:

The mounted platform should be constantly in a flat position no matter at what angle the base is tilted – done using accelerometers and servo motors

Date:

Ultrasonic based distance measuring robot:

Concept:

The robot should navigate indoors in a specified pathway using the ultrasonic sensor mounted on a servo motor

Date:

Wi-Fi Controlled robot:

Concept:

The robot should navigate using the commands sent through medium of Wi-Fi