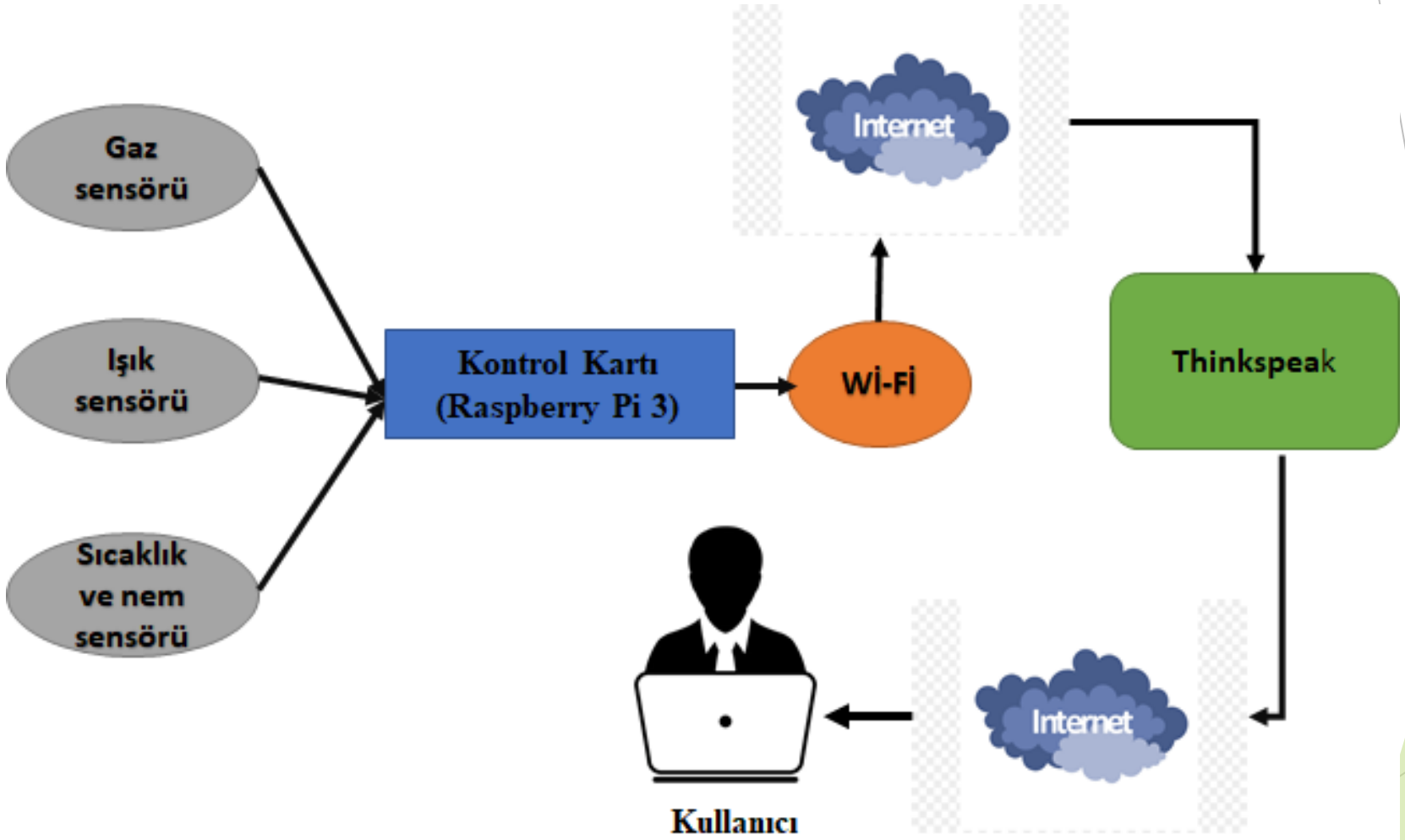
MARMARA ÜNİVERSİTESİ
FEN BİLİMLERİ ENSTİTÜSÜ

IOT Platform Tabanlı Kapalı Ortamlarda Hava Kalitesi bileşenlerinin Gerçek Zamanlı İzlenmesi için Sistem Tasarımı

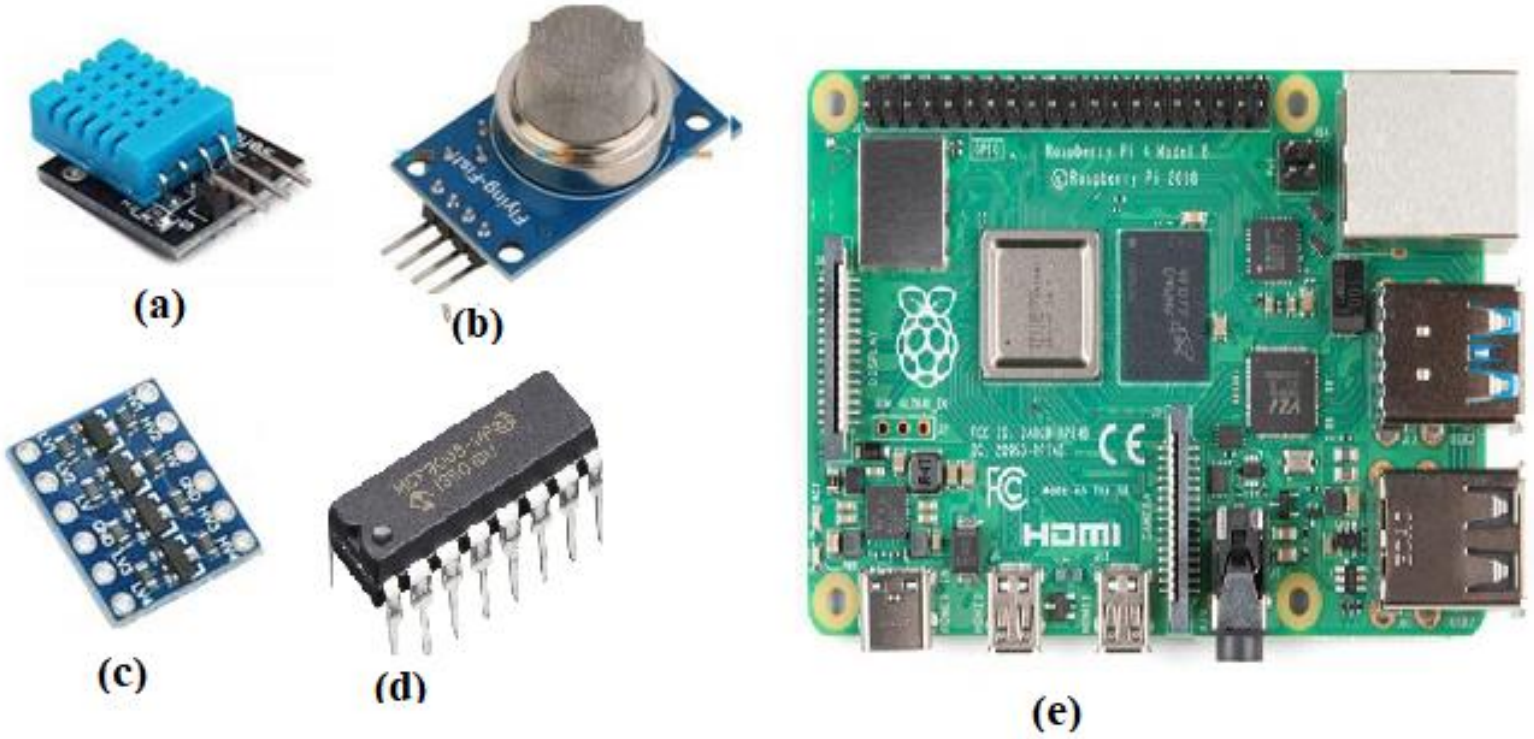
Rohullah RAHMATULLAH

Sistem tasarımı



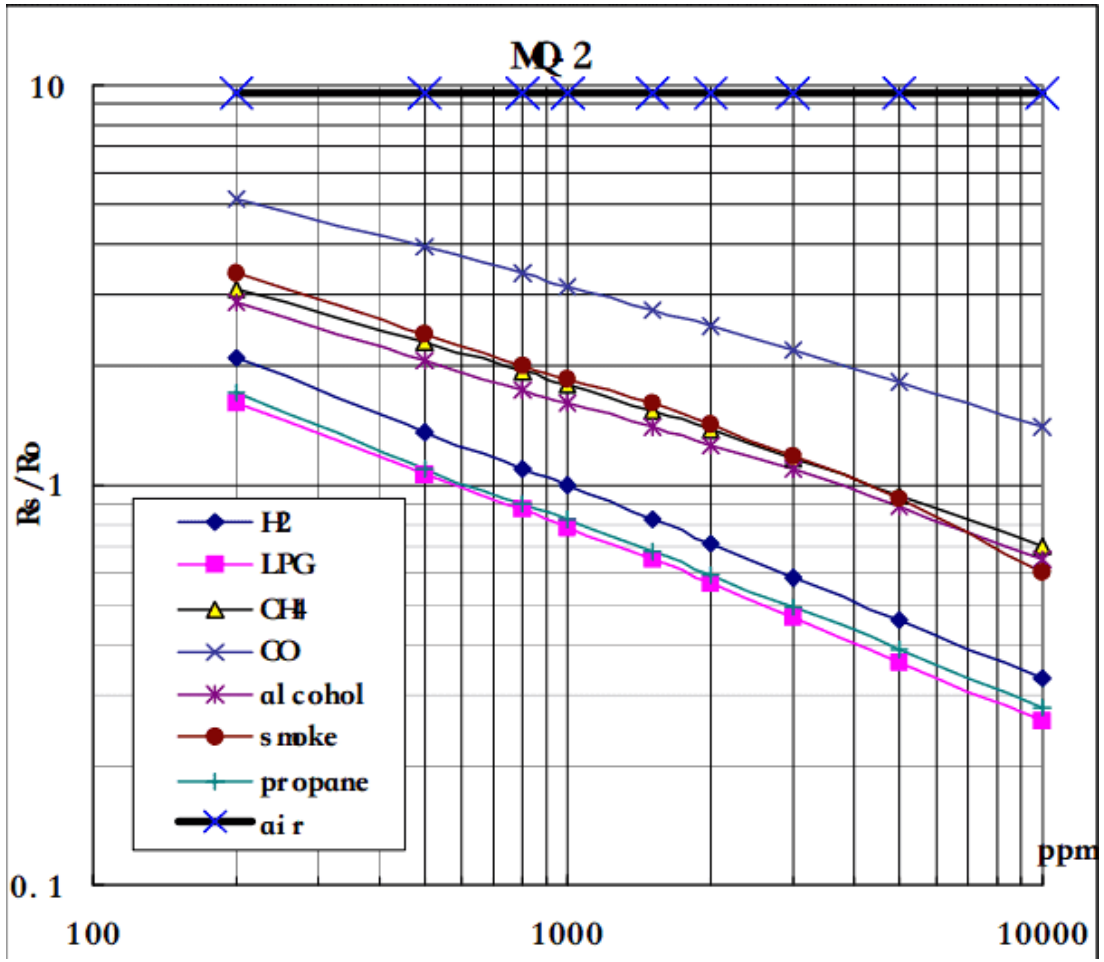
Şekil 1. önerilen sistemin mimarisi

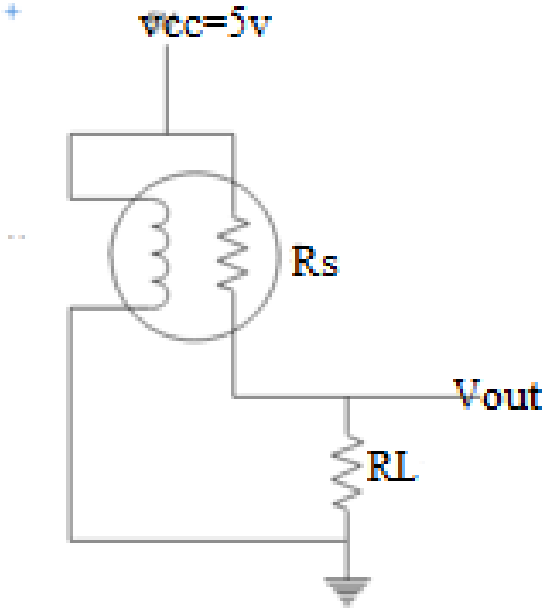
Sistem Bileşenleri



Şekil 2: a. DHT11 sensörü, b. MQ2 sensörü c. seviyesi dönüştürücü (TTL), d. MCP3008, e. Raspberry Pi.

MQ2 Gaz sensörü





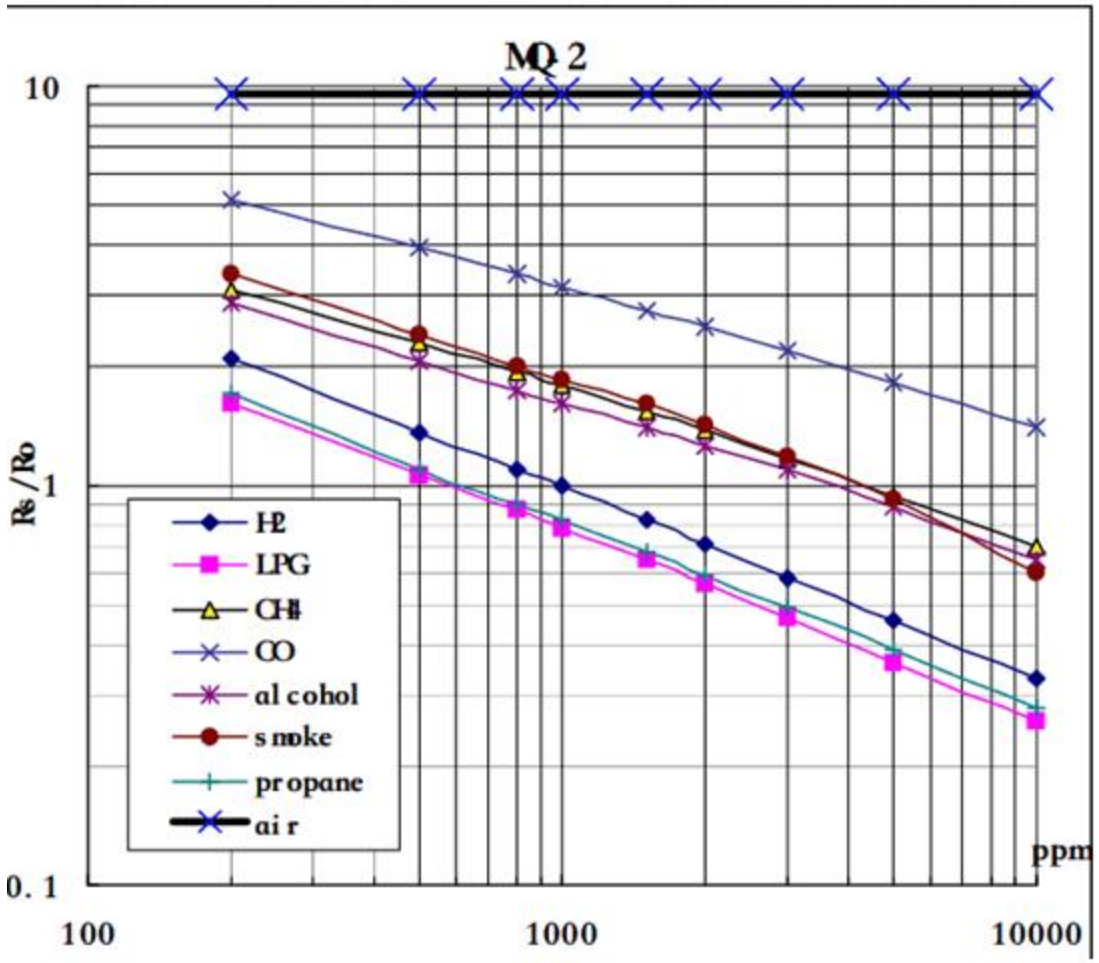
$$\log(y) = m\log(x) + b, \qquad m = \frac{\log(\frac{R_{s1}}{R_0} - \frac{R_s}{R_0})}{\log(x1 - x0)}$$

$$b = \log\left(\frac{R_{s1}}{R_0}\right) - \log\big(x(pmm)\big) => x(pmm) = 10^{\frac{\log(y-b)}{m}}$$

$$R_s = \frac{R_L \times V_{cc}}{V_{0ut}} - R_L$$

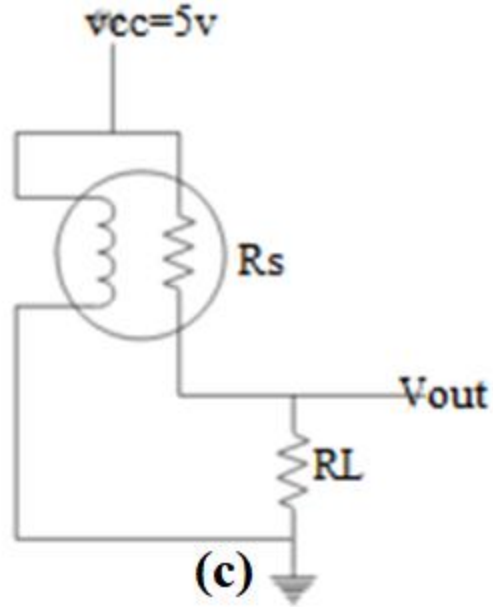
Şekil 3: a. MQ-2'nin hassasiyet özellikleri, b. MQ2 sensörü c. MQ2 sensörü Eş değer devresi.

MQ2 Gaz sensörü



(a)

(b)



(c)

$$\log(y) = m\log(x) + b, \qquad m = \frac{\log(\frac{R_{s1}}{R_0} - \frac{R_s}{R_0})}{\log(x1 - x0)}$$

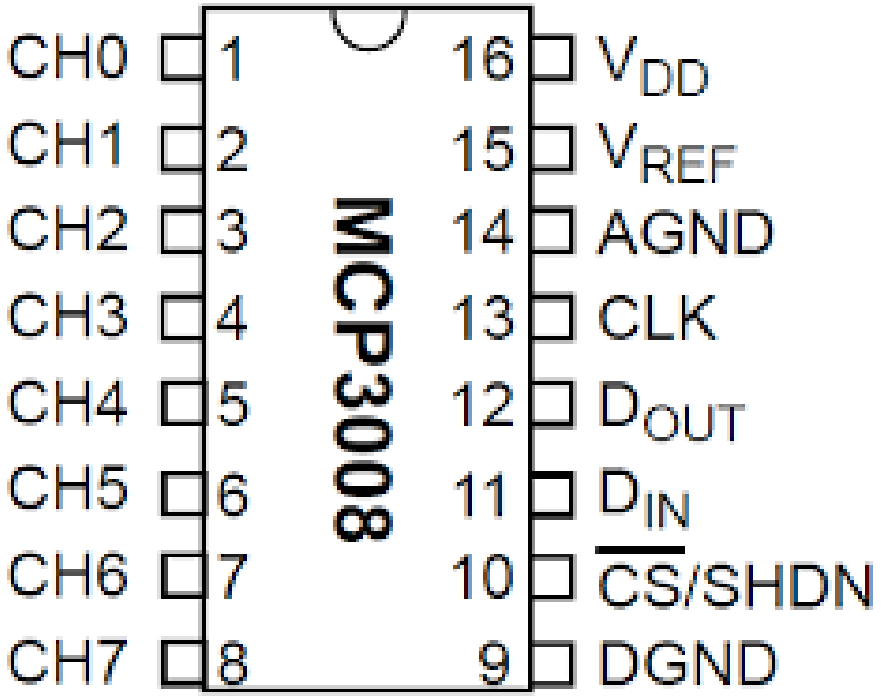
$$b = \log\left(\frac{R_{s1}}{R_0}\right) - \log\big(x(pmm)\big) => x(pmm) = 10^{\frac{\log(y-b)}{m}}$$

$$R_s = \frac{R_L \times V_{cc}}{V_{out}} - R_L$$

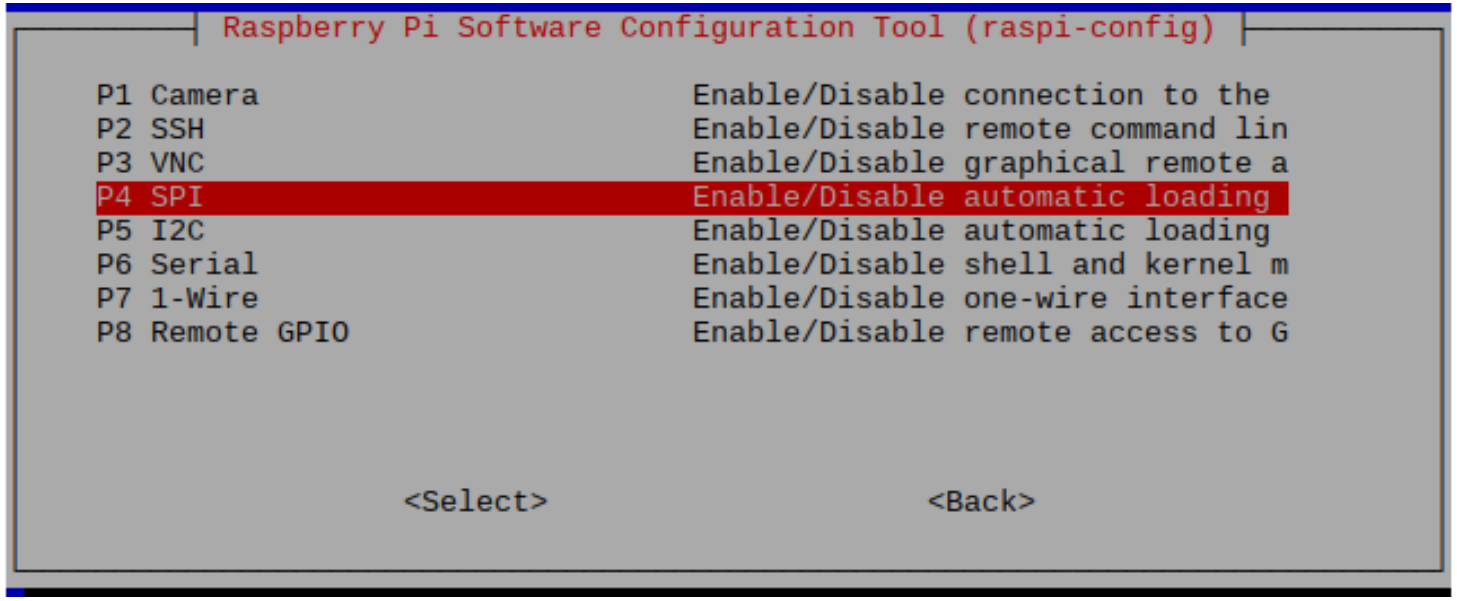
Şekil 3: a. MQ-2'nin hassasiyet özellikleri, b. MQ2 sensörü c. MQ2 sensörü Eş değer devresi.

MCP3008

- Analogdan dönüştürücü(ADC)
- Çözünürlük=10 bit=1023
- SPI Serial Peripheral Interface(0,0 ve 1,1 modları) iletişim



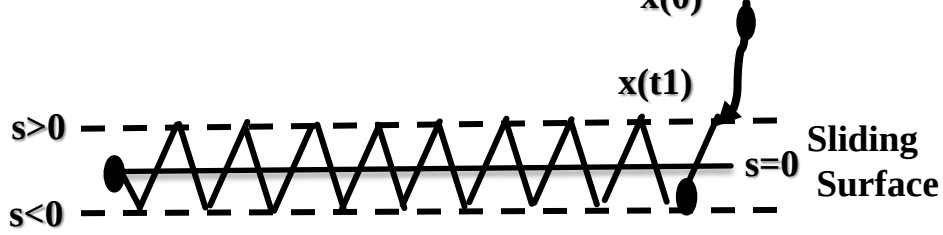
sudo raspi-config>>>>>>>>>>Interfacing Options>>>>>>>

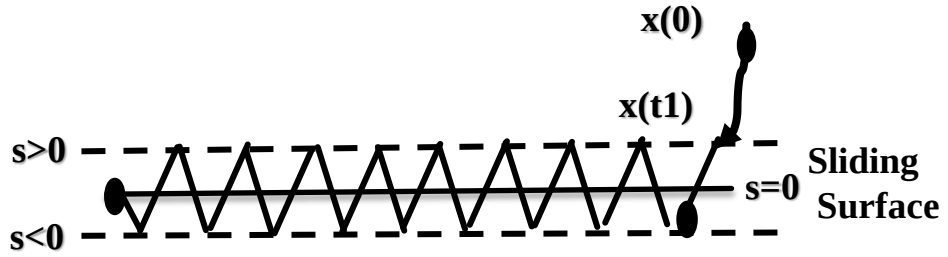


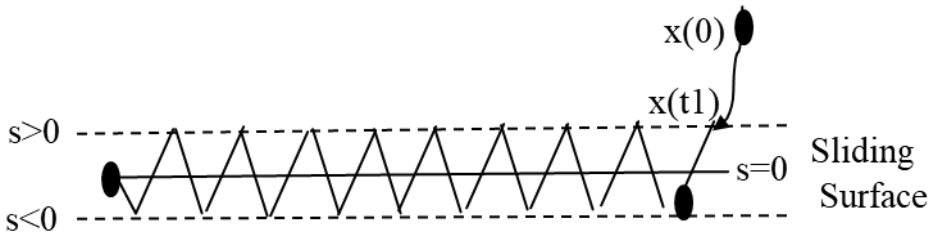
git clone https://github.com/adafruit/Adafruit_Python_DHT.git && cd Adafruit_Python_DHT
sudo apt-get install -y python3-dev

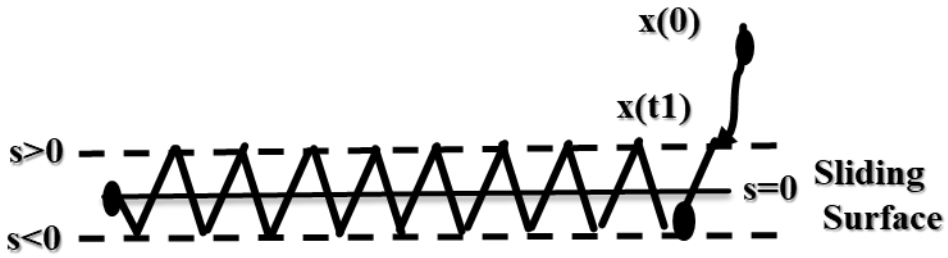
pip3 install Thingspeak
pip3 install urllib3

```
from mq import *
from urllib.request import urlopen
import RPi.GPIO as GPIO
import dht11
import time
GPIO.setwarnings(False)
GPIO.setmode(GPIO.BCM)
sensor = dht11.DHT11(pin=14)
API = "X6UBWOZQPCJ31REM"
URL = "https://api.thingspeak.com/update?api_key={}".format(API)
try:
    print("Press CTRL+C to abort.")
    mq = MQ();
    while True:
        result =sensor.read()
        if result.is_valid():
            perc = mq.MQPercentage()
            print("Sıcaklık:{}C  Nem:{}%  LPG:{}pmm  CO:{}pmm  Duman:{}pmm
".format(result.temperature,result.humidity,perc["GAS_LPG"], perc["CO"], perc["SMOKE"]))
            thingspeakHttp =URL +
"&field1={}&field2={}&field3={}&field4={}&field5={}".format(result.temperature,result.humidity,perc["GAS_LPG"],
perc["CO"], perc["SMOKE"])
            conn = urlopen(thingspeakHttp)
            time.sleep(1)
except:
```

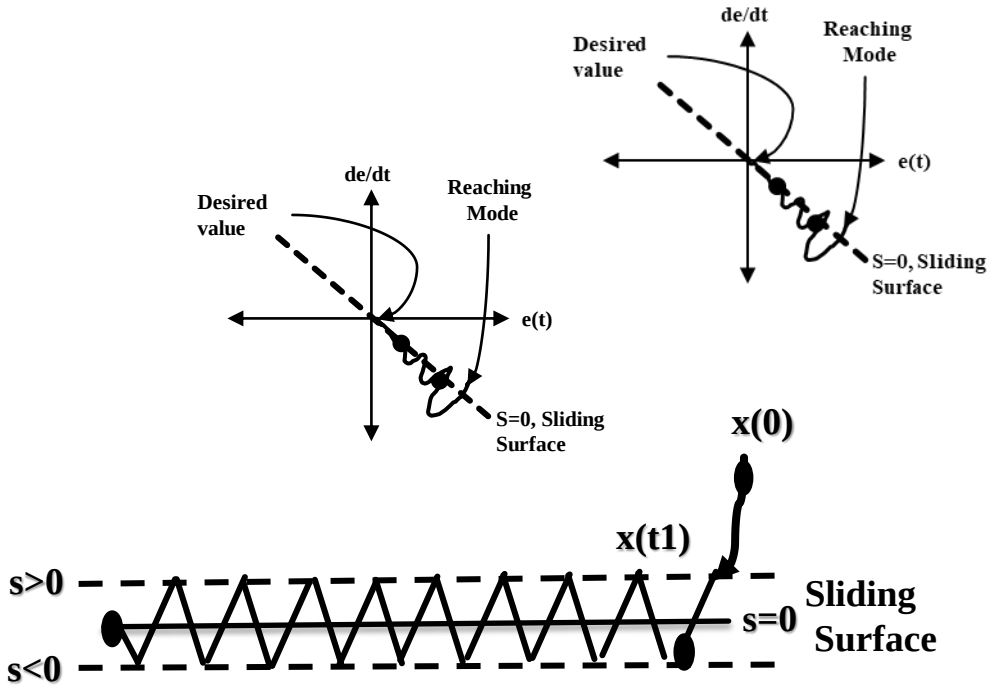








Sliding Surface


de/dt
Desired value
Reaching Mode
e(t)
S=0, Sliding Surface
de/dt
Desired value
Reaching Mode
e(t)
S=0, Sliding Surface
x(0)
x(t1)
s>0
s<0
s=0
Sliding Surface