DATA

In [1]:

```
with open('TPA.txt') as f:
    lines = f.readlines()
```

In [2]:

```
for x,i in enumerate(lines):
    lines[x] = i.strip("\n")
```

In [3]:

```
data_final = []
for line in lines:
 data_final.append(line.split(','))
```

In [4]:

```
temp = []
pressure = []
altitude = []
for x, i in enumerate(data_final):
    temp.append(data_final[x][0])
    pressure.append(data_final[x][1])
    altitude.append(data_final[x][2])

#print(f"The temperature list is: {temp}")
#print(f"The pressure list is: {pressure}")
#print(f"The altitude list is: {altitude}")

iterations = []

x = 0

for i in range(len(temp)):

    iterations.append(x)
    x += 1
```

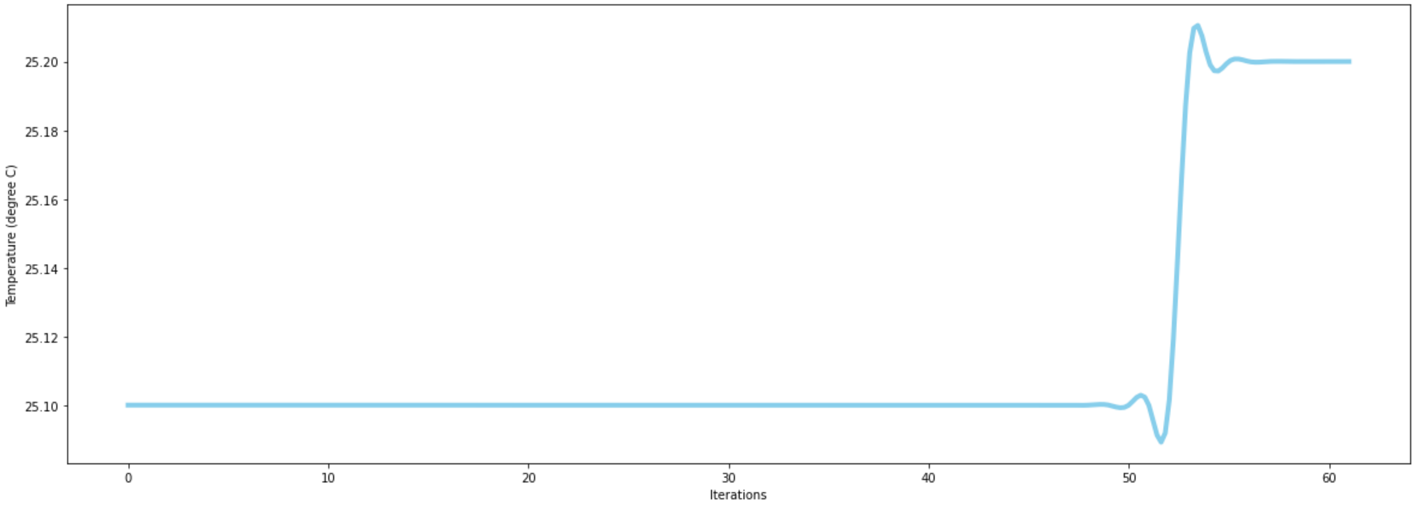
In [5]:

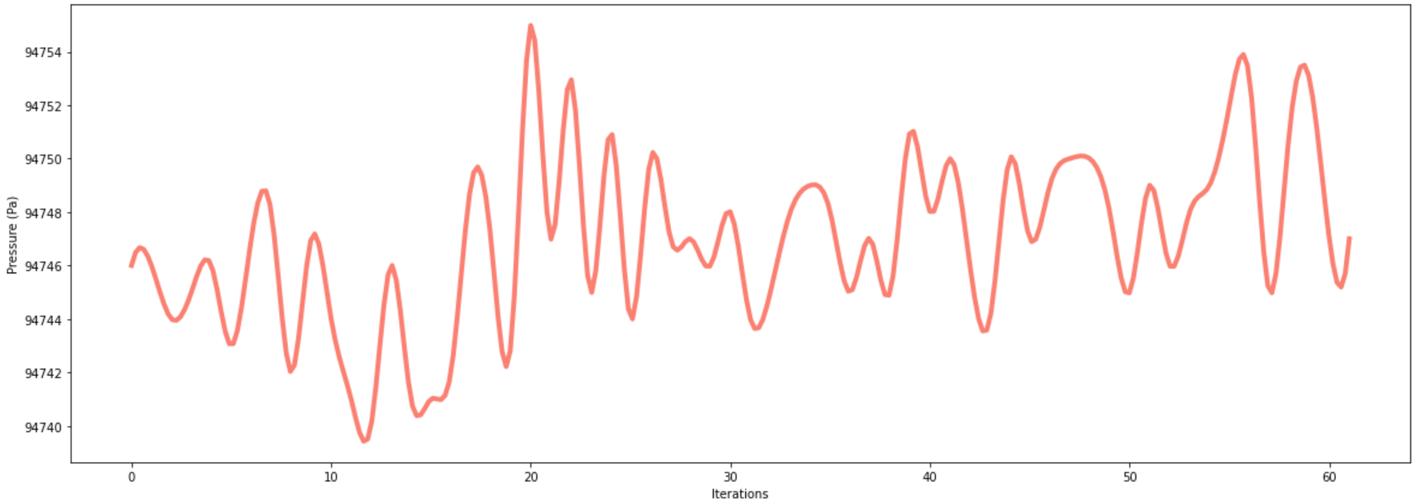
```
import matplotlib.pyplot as plt
from matplotlib.pyplot import figure
import numpy as np

from scipy.interpolate import make_interp_spline
```

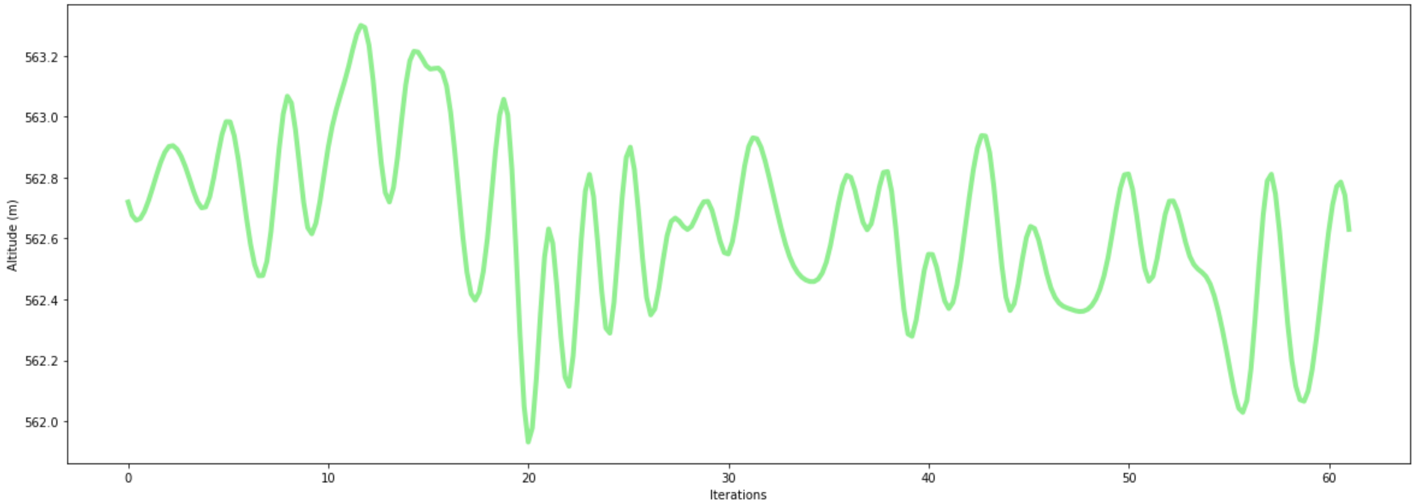
In [6]:

```
x = np.array(iterations)
y = np.array(temp)
y1 = np.array(pressure)
y2 = np.array(altitude)

color1 = 'skyblue'
color2 = 'salmon'
color3 = 'lightgreen'

linew = 4

plt.figure(figsize=(20, 7))

# naming the x axis
```

```
plt.xlabel('Iterations')

# naming the y axis
plt.ylabel('Temperature (degree C)')

x_smooth = np.linspace(x.min(),x.max(), 300)
y_smooth = make_interp_spline(x,y)(x_smooth)

plt.plot(x_smooth,y_smooth, color=color1, linewidth=linew)

plt.savefig('Graphs\Temperature vs iterations.png', bbox_inches='tight')
plt.show()

###############################################

y1_smooth = make_interp_spline(x,y1)(x_smooth)

plt.figure(figsize=(20, 7))

plt.plot(x_smooth,y1_smooth, color=color2, linewidth=linew)

# naming the x axis
plt.xlabel('Iterations')

# naming the y axis
plt.ylabel('Pressure (Pa)')

plt.savefig('Graphs\Pressure vs iterations.png', bbox_inches='tight')
plt.show()

###############################################

y1_smooth = make_interp_spline(x,y2)(x_smooth)

plt.figure(figsize=(20, 7))

plt.plot(x_smooth,y1_smooth, color=color3, linewidth=linew)

# naming the x axis
plt.xlabel('Iterations')

# naming the y axis
plt.ylabel('Altitude (m)')

plt.savefig('Graphs\Altitude vs iterations.png', bbox_inches='tight')
plt.show()
```







In [7]:

```
with open('GYRO.txt') as f:
    lines = f.readlines()
```

In [8]:

```
for x,i in enumerate(lines):
    lines[x] = i.strip("\n")
```

In [9]:

```
# [['0.17,-0.31,-10.13', '0.0000,0.0000,0.0000', '20.3750,42.8750,36.6875'],...]

data_final = []
for line in lines:
 data_final.append(line.split(';'))
```

In [10]:

```
# Separate values into one list of shape: ['0.18,-0.34,-9.93', '0.17,-0.34,-9.88', '0.11,-

accele = []
gyro = []
magne = []

for i in data_final:
    accele.append(i[0])
    gyro.append(i[1])
    magne.append(i[2])
```

In [11]:

```
# Separate the acceleration values into a list of lists of shape: [['0.18', '-0.34', '-9.

accele2 = []
```

```
for i,x in enumerate(accele):
    accele2.append(accele[i].split(','))

gyro2 = []
for i,x in enumerate(gyro):
    gyro2.append(gyro[i].split(','))

magne2 = []
for i,x in enumerate(magne):
    magne2.append(magne[i].split(','))
```

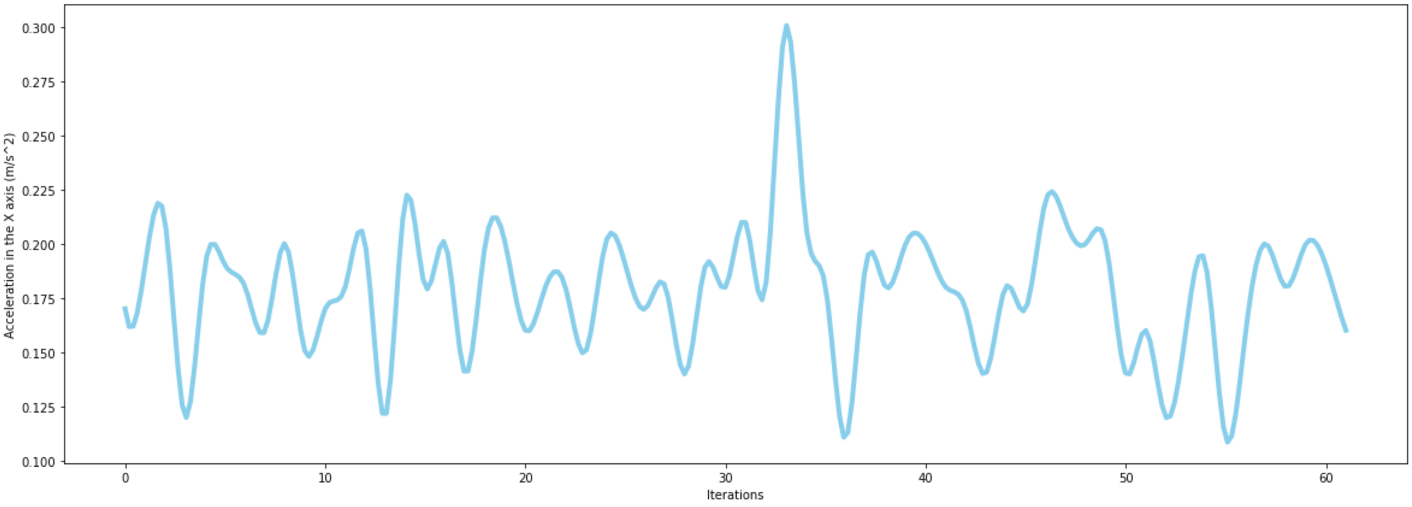
In [12]:

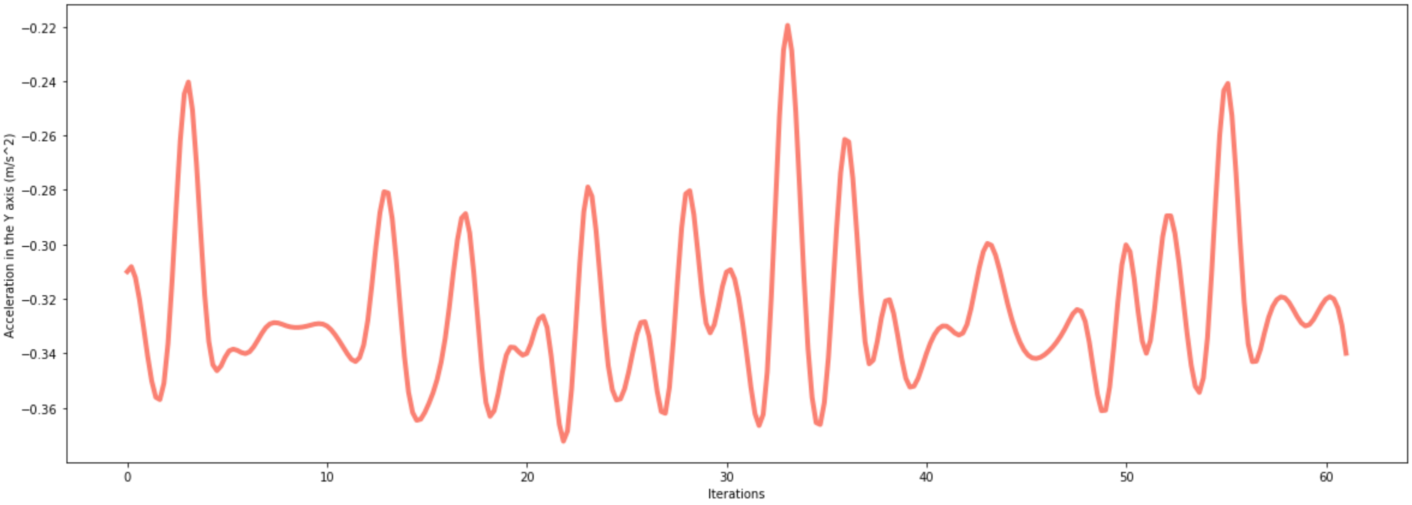
```
# Make individual list for every axis and transform to floats:
#  Accelerometer (X) [0.18, 0.17, 0.11, 0.13, 0.2, 0.19, 0.17, 0.19,...]
#  Accelerometer (y) [-0.34, -0.34, -0.32, -0.25, -0.35, -0.34, -0.36,...]
#  Accelerometer (Z) [-9.93, -9.88, -9.96, -10.03, -9.83, -9.97,...]

accele2x = []
accele2y = []
accele2z = []

for i, x in enumerate(accele2):
    accele2x.append(float(accele2[i][0]))
    accele2y.append(float(accele2[i][1]))
    accele2z.append(float(accele2[i][2]))

gyro2x = []
gyro2y = []
gyro2z = []

for i, x in enumerate(gyro2):
    gyro2x.append(float(gyro2[i][0]))
    gyro2y.append(float(gyro2[i][1]))
    gyro2z.append(float(gyro2[i][2]))
```

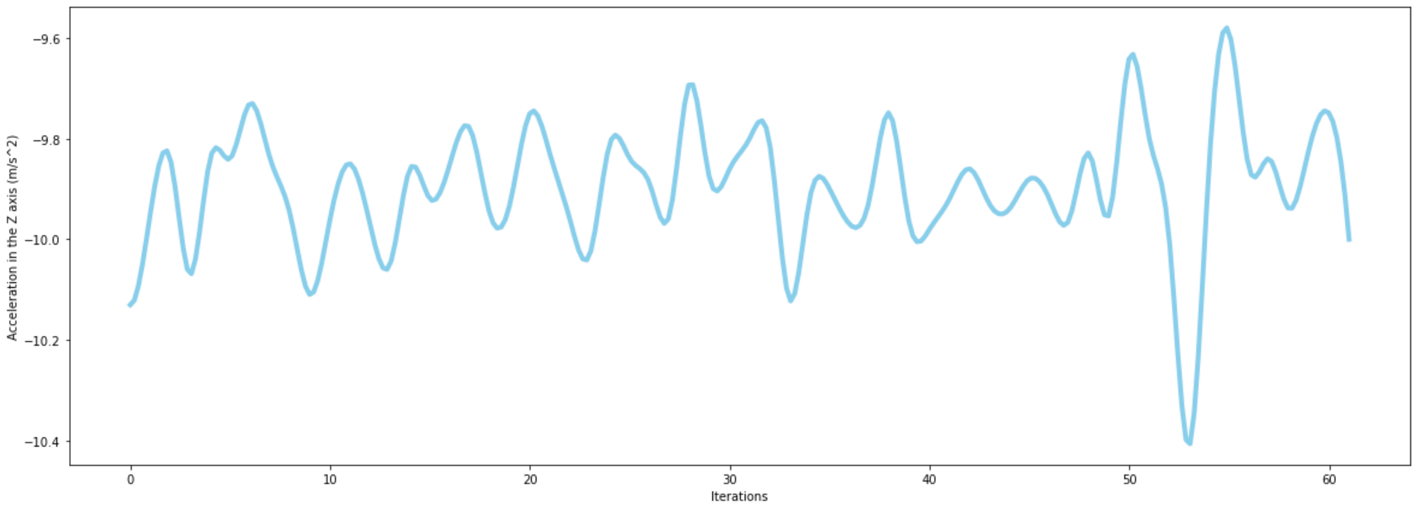
In [13]:

```
x = np.array(iterations)

y_accel_x = np.array(accele2x)

plt.figure(figsize=(20, 7))

# naming the x axis
plt.xlabel('Iterations')

# naming the y axis
plt.ylabel('Acceleration in the X axis (m/s^2)')

x_smooth_accel = np.linspace(x.min(),x.max(), 300)
y_smooth_accel = make_interp_spline(x,y_accel_x)(x_smooth)

plt.plot(x_smooth_accel,y_smooth_accel, color=color1, linewidth=linew)


plt.savefig('Graphs\Acceleration (X) vs iterations.png', bbox_inches='tight')
plt.show()

y_accel_y = np.array(accele2y)

plt.figure(figsize=(20, 7))

# naming the x axis
plt.xlabel('Iterations')

# naming the y axis
```

```
plt.ylabel('Acceleration in the Y axis (m/s^2)')

x_smooth_accel = np.linspace(x.min(),x.max(), 300)
y_smooth_accel = make_interp_spline(x,y_accel_y)(x_smooth)

plt.plot(x_smooth_accel,y_smooth_accel, color=color2, linewidth=linew)

plt.savefig('Graphs\Acceleration (Y) vs iterations.png', bbox_inches='tight')
plt.show()

y_accel_z = np.array(accele2z)

plt.figure(figsize=(20, 7))

# naming the x axis
plt.xlabel('Iterations')

# naming the y axis
plt.ylabel('Acceleration in the Z axis (m/s^2)')

x_smooth_accel = np.linspace(x.min(),x.max(), 300)
y_smooth_accel = make_interp_spline(x,y_accel_z)(x_smooth)

plt.plot(x_smooth_accel,y_smooth_accel, color=color1, linewidth=linew)

plt.savefig('Graphs\Acceleration (Z) vs iterations.png', bbox_inches='tight')
plt.show()
```



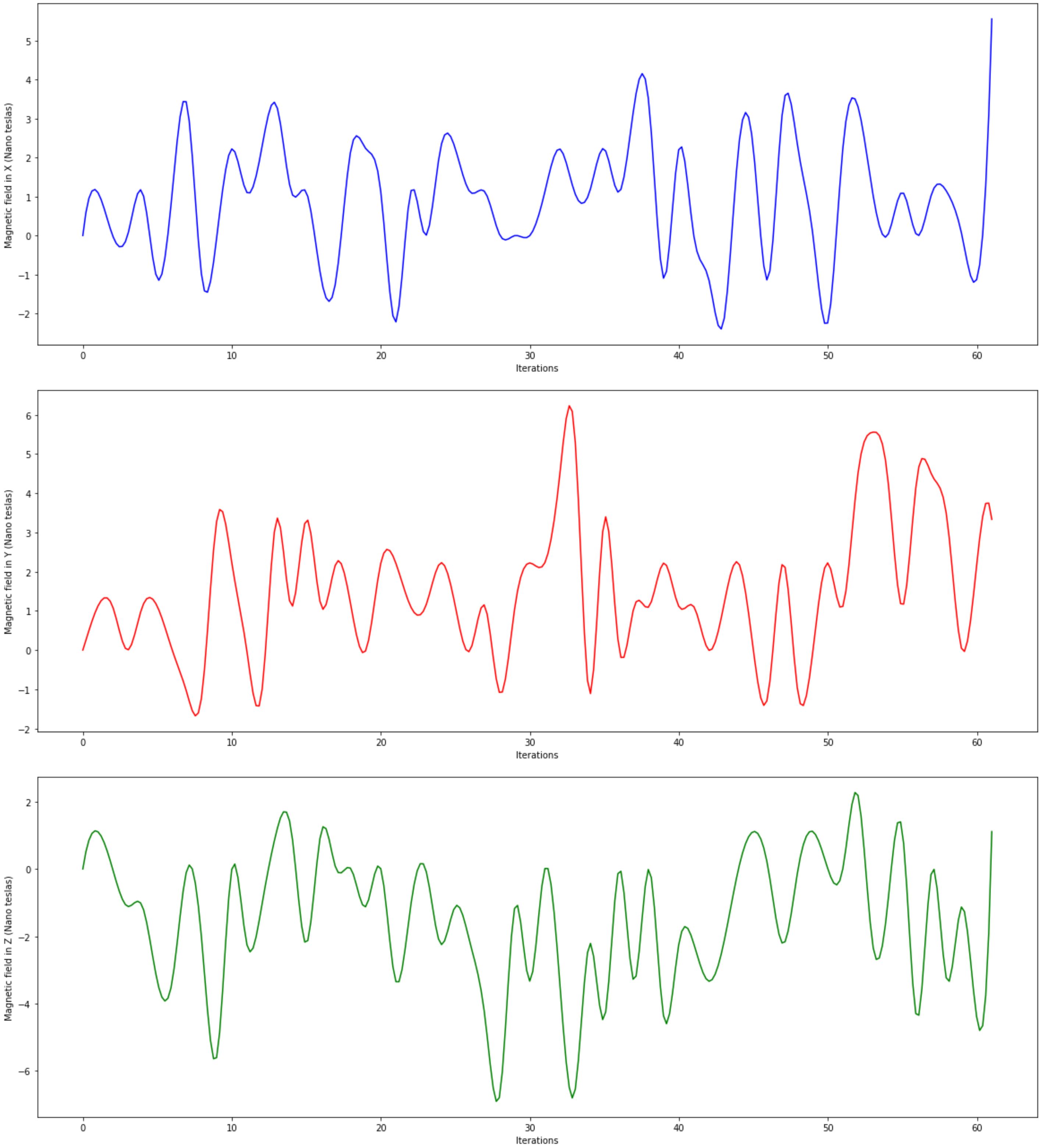




In [14]:

```
y_gyro_x = np.array(gyro2x)

plt.figure(figsize=(20, 7))

# naming the x axis
plt.xlabel('Iterations')

# naming the y axis
plt.ylabel('Magnetic field in X (Nano teslas)')

x_smooth_accel = np.linspace(x.min(),x.max(), 300)
y_smooth_accel = make_interp_spline(x,y_gyro_x)(x_smooth)

plt.plot(x_smooth_accel,y_smooth_accel, color = 'blue')

plt.savefig('Graphs\Magnetic field (X) vs iterations.png', bbox_inches='tight')
plt.show()

y_gyro_y = np.array(gyro2y)

plt.figure(figsize=(20, 7))

# naming the x axis
plt.xlabel('Iterations')

# naming the y axis
plt.ylabel('Magnetic field in Y (Nano teslas)')

x_smooth_accel = np.linspace(x.min(),x.max(), 300)
y_smooth_accel = make_interp_spline(x,y_gyro_y)(x_smooth)

plt.plot(x_smooth_accel,y_smooth_accel, color = 'red')

plt.savefig('Graphs\Magnetic field (Y) vs iterations.png', bbox_inches='tight')
plt.show()

y_gyro_z = np.array(gyro2z)

plt.figure(figsize=(20, 7))

# naming the x axis
plt.xlabel('Iterations')

# naming the y axis
plt.ylabel('Magnetic field in Z (Nano teslas)')

x_smooth_accel = np.linspace(x.min(),x.max(), 300)
y_smooth_accel = make_interp_spline(x,y_gyro_z)(x_smooth)
```

```
plt.plot(x_smooth_accel,y_smooth_accel, color = 'green')

plt.savefig('Graphs\Magnetic field (Z) vs iterations.png', bbox_inches='tight')

plt.show()
```



```
In [ ]:
```