Chapter 6 - exercise 5: Women in Science

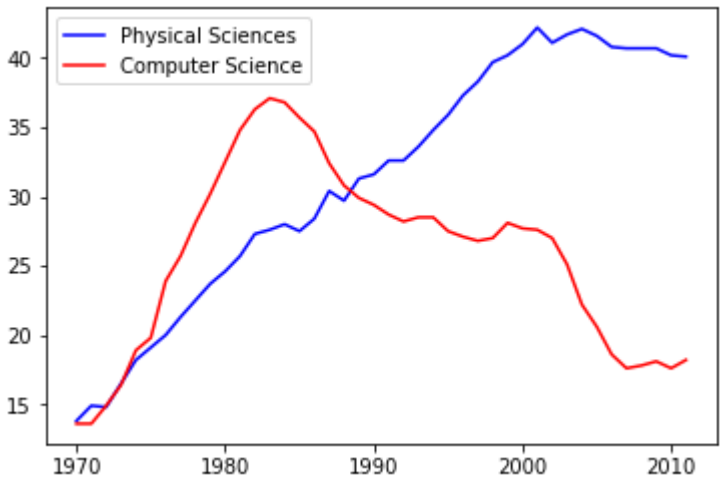
Cho dữ liệu trong tập tin du_lieu_bai_5.txt gồm các biến: year, physical_sciences, computer_science, health, education

Hãy thực hiện các yêu cầu sau:

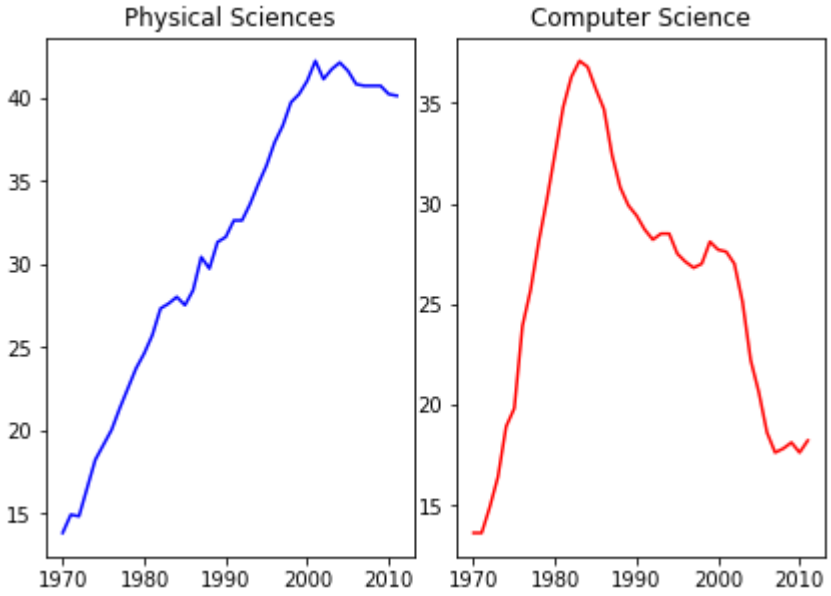
1. Vẽ biểu đồ line plot có 2 line: line 1: year,physical_sciences, color='blue', line 2: year,computer_science, color='red'
2. Vẽ 2 biểu đồ line plot ở câu 1 nhưng trên 2 vùng: vùng 1: plt.axes([0.05, 0.05, 0.425, 0.9]), và vùng 2: plt.axes([0.525, 0.05, 0.425, 0.9])
3. Vẽ 2 biểu đồ line plot ở câu 1 nhưng trên 2 subplot: subplot 1: plt.subplot(1, 2, 1), và subplot 2: plt.subplot(1, 2, 2), nhớ sử dụng plt.tight_layout() trước khi show()
4. Vẽ 4 biểu đồ line với 4 màu khác nhau: line 1: year,physical_sciences, line 2: year,computer_science, line 3: year, health, line 4: year, education, trên 4 subplot: plt.subplot(2, 2, 1), plt.subplot(2, 2, 2), plt.subplot(2, 2, 3), plt.subplot(2, 2, 1)
5. Vẽ 2 biểu đồ line plot: line 1: year,computer_science và line 2: year, physical_sciences, có plt.xlim(1980, 2000) và plt.ylim(0, 50). Lưu biểu đồ này thành file hình.png
6. Vẽ 2 biểu đồ line plot: line 1: year,computer_science và line 2: year, physical_sciences, có plt.xlim(1990, 2010) và plt.ylim(0, 50)
7. Vẽ 2 biểu đồ line plot: line 1: year,computer_science và line 2: year, physical_sciences, có plt.axis([1990, 2010, 0, 50]). Lưu biểu đồ này thành file hình.png

In [1]:
```
# Import matplotlib.pyplot
import matplotlib.pyplot as plt
import numpy as np
year = np.array([1970, 1971, 1972, 1973, 1974, 1975, 1976, 1977, 1978, 1979, 1980,
physical_sciences = np.array([13.8, 14.9, 14.8, 16.5, 18.2, 19.1, 20.0, 21.3, 22.5
computer_science = np.array([13.6, 13.6, 14.9, 16.4, 18.9, 19.8, 23.9, 25.7, 28.1,
```

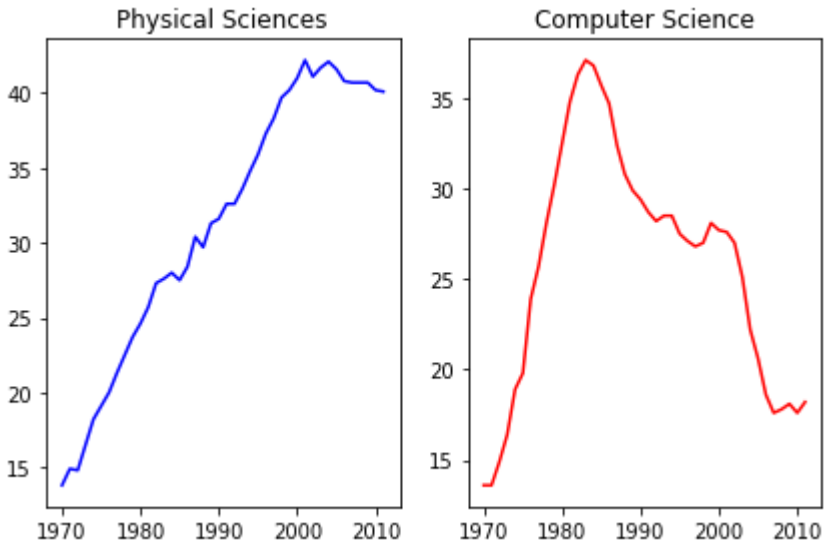
In [2]:
```
# Câu 1:
# Plot in blue the % of degrees awarded to women in the Physical Sciences
plt.plot(year,physical_sciences, color='blue', label = "Physical Sciences")

# Plot in red the % of degrees awarded to women in Computer Science

plt.plot(year,computer_science, color='red', label = "Computer Science")

plt.legend()

# Display the plot

plt.show()
```



In [3]:
```
# câu 2: Vẽ 2 biểu đồ line plot ở câu 1 nhưng trên 2 vùng: vùng 1: plt.axes([0.05,
#và vùng 2: plt.axes([0.525, 0.05, 0.425, 0.9])

# Create plot axes for the first line plot
#plt.axes([xlo, ylo, width, height])
plt.axes([0.05, 0.05, 0.425, 0.9])

# Plot in blue the % of degrees awarded to women in the Physical Sciences
plt.plot(year,physical_sciences, color='blue')
plt.title("Physical Sciences")

# Create plot axes for the second line plot
plt.axes([0.525, 0.05, 0.425, 0.9])

# Plot in red the % of degrees awarded to women in Computer Science
plt.plot(year,computer_science, color='red')
plt.title("Computer Science")
# Display the plot
plt.show()
```

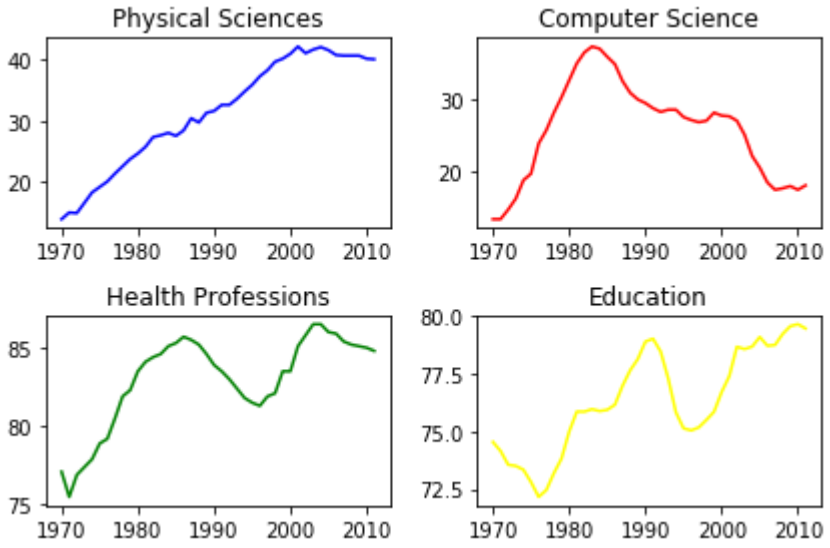


In [4]:
```
# Câu 3:
# Create a figure with 1x2 subplot and make the left subplot active
# plt.subplot(m, n, k) # so dong, so cot, so thu tu
plt.subplot(1, 2, 1)
# Plot in blue the % of degrees awarded to women in the Physical Sciences
plt.plot(year, physical_sciences, color='blue')
plt.title('Physical Sciences')

# Make the right subplot active in the current 1x2 subplot grid
plt.subplot(1, 2, 2)
# Plot in red the % of degrees awarded to women in Computer Science
plt.plot(year, computer_science, color='red')
plt.title('Computer Science')

# Use plt.tight_layout() to improve the spacing between subplots
plt.tight_layout()
plt.show()
```

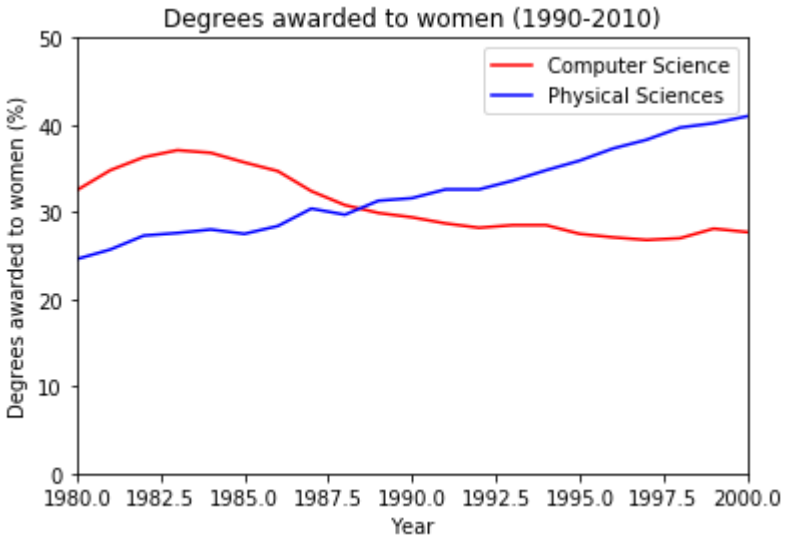


In [5]:
```
health = np.array([77.1, 75.5, 76.9, 77.4, 77.9, 78.9, 79.2, 80.5, 81.9, 82.3, 83.
education = np.array([74.53532758, 74.14920369, 73.55451996, 73.50181443, 73.33681
```

In [6]:
```
# Câu 4
# Create a figure with 2x2 subplot layout and make the top left subplot active
plt.subplot(2, 2, 1)
# Plot in blue the % of degrees awarded to women in the Physical Sciences
plt.plot(year,physical_sciences, color='blue')
plt.title('Physical Sciences')

# Make the top right subplot active in the current 2x2 subplot grid
plt.subplot(2, 2, 2)

# Plot in red the % of degrees awarded to women in Computer Science
plt.plot(year, computer_science, color='red')
plt.title('Computer Science')

# Make the bottom left subplot active in the current 2x2 subplot grid
plt.subplot(2, 2, 3)

# Plot in green the % of degrees awarded to women in Health Professions
plt.plot(year, health, color='green')
plt.title('Health Professions')

# Make the bottom right subplot active in the current 2x2 subplot grid
plt.subplot(2, 2, 4)

# Plot in yellow the % of degrees awarded to women in Education
plt.plot(year, education, color='yellow')
plt.title('Education')

# Improve the spacing between subplots and display them
plt.tight_layout()
plt.show()
```

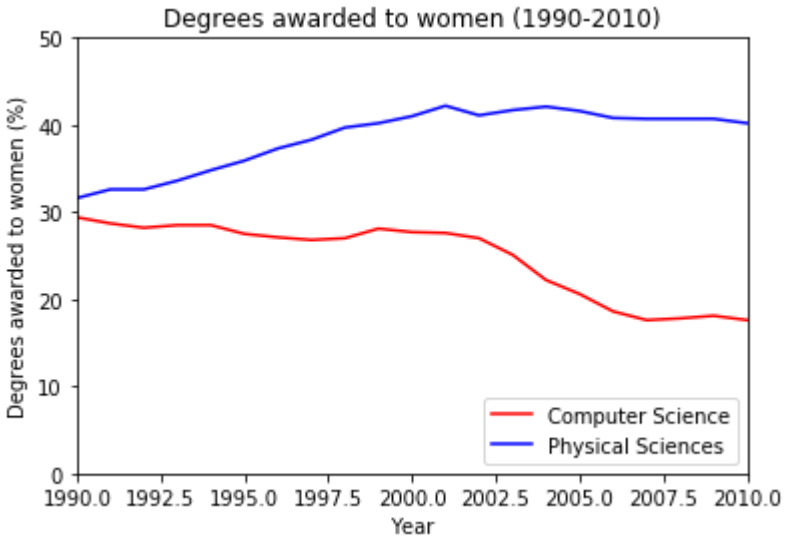


In [7]:
```
# Câu 5:
# Plot the % of degrees awarded to women in Computer Science and the Physical Scie
plt.plot(year,computer_science, color='red', label = "Computer Science")
plt.plot(year, physical_sciences, color='blue', label = "Physical Sciences")

# Add the axis labels
plt.xlabel('Year')
plt.ylabel('Degrees awarded to women (%)')

# Set the x-axis range
plt.xlim(1980, 2000)

# Set the y-axis range
plt.ylim(0, 50)

# Add a title and display the plot
plt.title('Degrees awarded to women (1990-2010)')
plt.legend()
plt.show()

# Save the image as 'xlim_and_ylim.png'
plt.savefig("xlim_and_ylim.png")
```



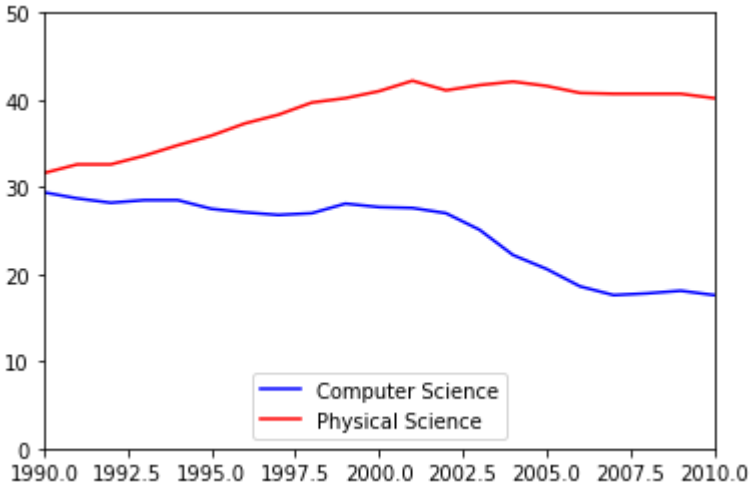

```
<Figure size 432x288 with 0 Axes>
```

In [8]:
```
# Câu 6:
# Plot the % of degrees awarded to women in Computer Science and the Physical Scie
plt.plot(year,computer_science, color='red', label = 'Computer Science')
plt.plot(year, physical_sciences, color='blue', label = 'Physical Sciences')

# Add the axis labels
plt.xlabel('Year')
plt.ylabel('Degrees awarded to women (%)')

# Set the x-axis range
plt.xlim(1990, 2010)

# Set the y-axis range
plt.ylim(0, 50)

# Add a title and display the plot
plt.title('Degrees awarded to women (1990-2010)')
plt.legend(loc=4)
plt.show()

# Save the image as 'xlim_and_ylim.png'
plt.savefig("xlim_and_ylim.png")
```



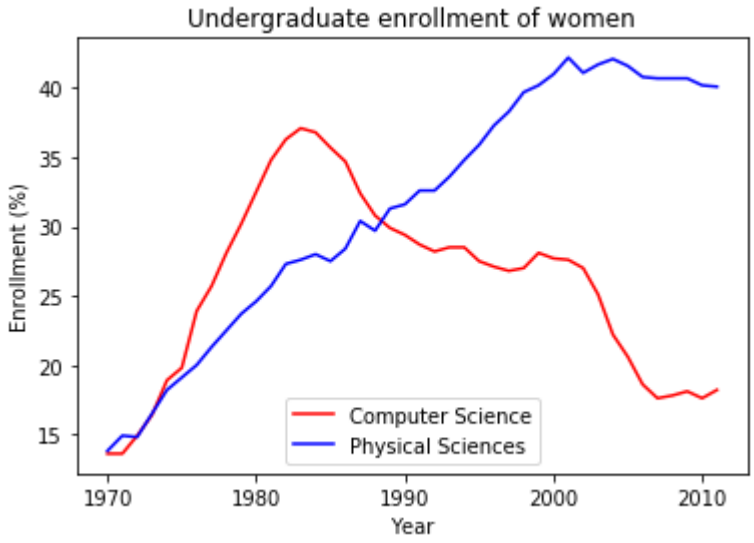

```
<Figure size 432x288 with 0 Axes>
```

In [9]:
```
# Câu 7:
# Plot in blue the % of degrees awarded to women in Computer Science
plt.plot(year,computer_science, color='blue', label='Computer Science')

# Plot in red the % of degrees awarded to women in the Physical Sciences
plt.plot(year, physical_sciences,color='red', label='Physical Science' )

# Set the x-axis and y-axis limits
plt.axis([1990, 2010, 0, 50])

plt.legend(loc='lower center')

# Show the figure
plt.show()

# Save the figure as 'axis_limits.png'
plt.savefig("axis_limits.png")
```




```
<Figure size 432x288 with 0 Axes>
```

In [10]:
```
# Câu 8:
# Specify the label 'Computer Science'
plt.plot(year, computer_science, color='red', label='Computer Science')

# Specify the label 'Physical Sciences'
plt.plot(year, physical_sciences, color='blue', label='Physical Sciences')

# Add a legend at the lower center
plt.legend(loc='lower center')

# Add axis labels and title
plt.xlabel('Year')
plt.ylabel('Enrollment (%)')
plt.title('Undergraduate enrollment of women')
plt.show()
```



In [ ]:
```

```