Project

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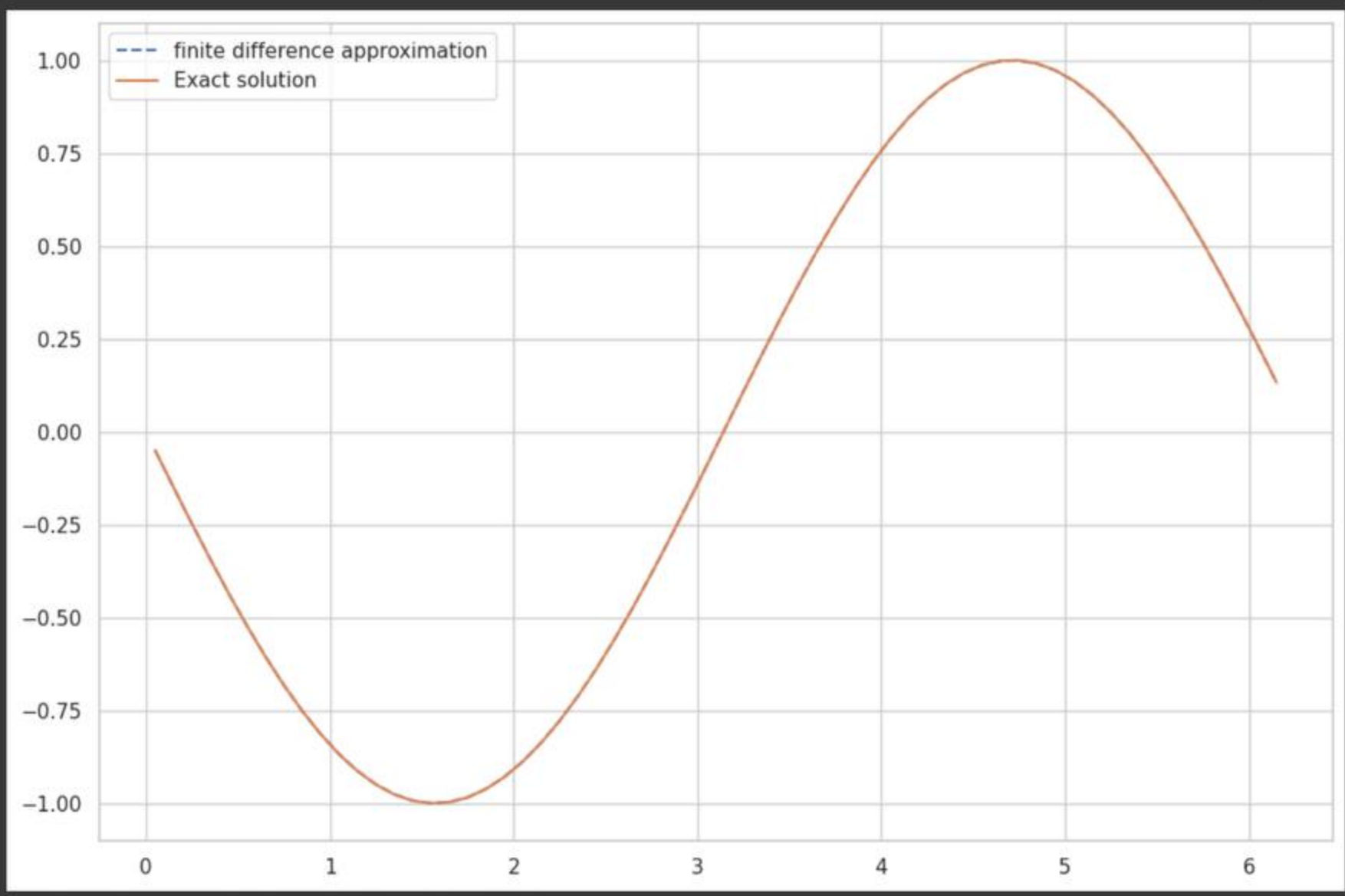
```python
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns

sns.set_theme(style="whitegrid")

h = 0.1
x = np.arange(0, 2 * np.pi, h)
y = np.cos(x)
forward_diff = np.diff(y) / h
x_diff = x[1:] - h / 2
exact_solution = -np.sin(x_diff)

plt.figure(figsize=(12, 8))
plt.plot(x_diff, forward_diff, '--', label='finite difference approximation')
plt.plot(x_diff, exact_solution, '-', label='Exact solution')
plt.legend()
plt.show()

max_error = max(abs(exact_solution - forward_diff))
print("Maximum error:", max_error)
```




```
Maximum error: 0.0004165244994397 41
```