09-27_2D_Conduction_Example

September 27, 2023
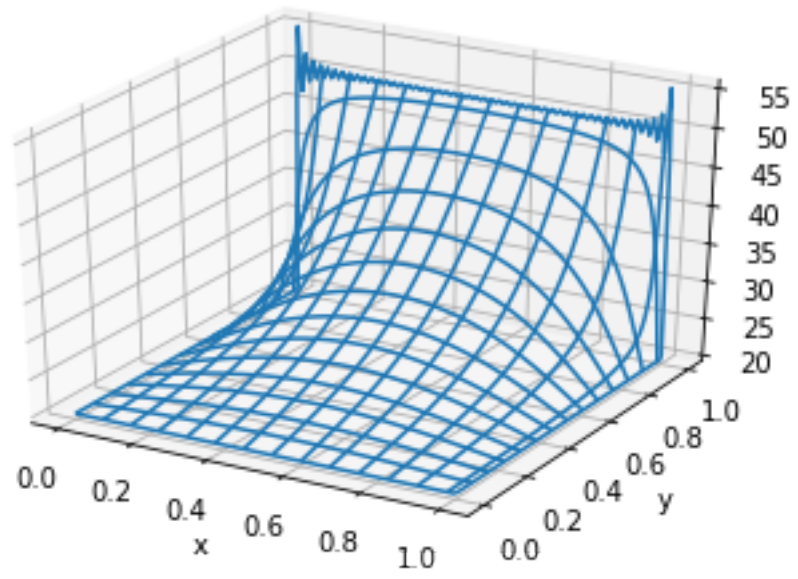
```python
[9]: import numpy as np
     import matplotlib.pyplot as plt
     from mpl_toolkits.mplot3d import axes3d
```

```python
[87]: num_points = 200
      N = 100
      W = 1
      L = 1
      x = np.linspace(0, L, num_points)
      y = np.linspace(0, W, num_points)
      X, Y = np.meshgrid(x, y)
      X = np.atleast_3d(X)
      Y = np.atleast_3d(Y)
      n = np.arange(1, N).reshape(1, 1, N - 1)
```

```python
[88]: theta = (2 / np.pi) * np.sum(((((-1)**(n+1) + 1) / n) * np.sin(n * np.pi * X /␣
      ↪L) * np.sinh(n * np.pi * Y / L) / np.sinh(n * np.pi * W / L), axis=2)
```

```python
[89]: T1 = 20
      T2 = 50
      T = theta * (T2 - T1) + T1
```

```python
[90]: fig = plt.figure()
      ax = fig.add_subplot(projection='3d')
      ax.plot_wireframe(X.squeeze(), Y.squeeze(), T, rstride=15, cstride=15)
      ax.set_xlabel("x")
      ax.set_ylabel("y")
      ax.set_zlabel("T");
```

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[ ]: d
```