Solution Review: Triple Integral Over a Bounded Region

This lesson provides the solution review for the previous exercise.

WE'LL COVER THE FOLLOWING

Solution

We were given the following integral to solve:

$$\int_0^{1-x-y} \int_0^{1-x} \int_0^{1} = (5x - 3y)\, dxdydz$$

```
from scipy import *
from scipy.integrate import tplquad

def f(z, y, x):
  return ((5 * x) - (3 * y))

# call tplquad to integrate the function f
# x goes from 0 to 1
# y goes from 0 to 1-x
# z goes from 0 to 1-x-y

val, err = tplquad(f, 0, 1, lambda x: 0, lambda x: 1 - x, lambda y, x: 0, lambda y, x: 1 - x

print("Value of integral:", val)
print("Error in integral:", err)
```

Explanation

- In lines 4 - 5, we have defined the function given in the exercise. Even

though we are not using `z` in the function definition, we need it for integration and hence, we have defined it as the function parameter.

- In line 12, we are calling `tplquad` for function `f`.
    - The limits of `x` go from `0` to `1`.
    - The limits of `y` are a function of `x` and go from `0` to `1 - x`.
    - The limits of `z` are a function of `x` and `y` and go from `0` to `1 - x - y`.

In the next lesson, we will solve an exercise to find the parameters of an FID signal.