Part A

Giving x-z=0.2,-0.5x+y+0.25z=-1.425,x-0.5y+z=2 to Wolfram leads to:

$$x \approx 0.806667, y \approx -1.17333, z \approx 0.606667$$

And with our code:

In [3]:
```
def gauss_seidel(A, b):
    solution = [0, 0, 0]
    previous_solution = [0, 0, 0]
    for _ in range(300):
        for k in range(3):
            sum_of_other_side = b[k]
            for j in range(3):
                if k != j:
                    sum_of_other_side -= solution[j] * A[k][j]
            previous_solution[k] = solution[k]
            solution[k] = sum_of_other_side / A[k][k] # dividing by the coefficient
    return solution
```

In [4]:
```
gauss_seidel([[1, 0, -1], [-0.5, 1, 0.25], [1, -0.5, 1]], [0.2, -1.425, 2])
```

Out[4]:
```
[0.8066666666666673, -1.1733333333333333, 0.606666666666666]
```

So, the result for part (a) is around $x = 0.81, y = -1.17, z = 0.61$.

Part B

Giving x-2z=0.2,-0.5x+y-0.25z=-1.425,x-0.5y+z=2 to Wolfram leads to:

$$x \approx 1.15789, y \approx -0.726316, z \approx 0.478947$$

And with our code:

In [5]:
```
gauss_seidel([[1, 0, -2], [-0.5, 1, -0.25], [1, -0.5, 1]], [0.2, -1.425, 2])
```

Out[5]:
```
[2.1568728252933877e+41, 1.3480455158083672e+41, -1.482850067389204e+41]
```

As this matrix is not diagonally dominant (for the first row, $1 > 0 + |-2|$ is wrong) so there is the possibility that it can diverge.