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CS 3010
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Assignment 2, exercise 4

Naive Gaussian Elimination output: 0.21602476699023043 -0.00791510608732474 0.6352433264885665 0.7461742760893735

SPP Gaussian Elimination output: 0.2160247670084124 -0.007915106087778005 0.6352433264931054 0.7461742760857157

If we plug in the result back into the equations, naive gaussian output will give us: [9.573999999999998, 7.2189999999834935, 5.729999999825766, 6.290999999877117]

Meanwhile SPP gaussian output will give us:
[9.574, 7.218999999999999, 5.7299999999999995, 6.291]

Compared to the original given constants, [9.5740, 7.2190, 5.7300, 6.2910], SPP gaussian elimination is more precise.

Naive Gaussian Elimination relative error average:

$$relative\ error\ average: \frac{\sum_{0}^{3} \frac{|\alpha-\beta|}{|\alpha|}}{n} = 3.758 * 10^{-11}$$

SPP Gaussian Elimination relative error average:

$$relative\ error\ average: \frac{\sum_{0}^{3} \frac{|\alpha-\beta|}{|\alpha|}}{n} = 2.258 * 10^{-16}$$

SPP Gaussian Elimination is more precise than Naive Gaussian Elimination because its relative error is a lot smaller than naive.