

# Systems of Equations

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## Objective:

Systems of equations are common within all engineering disciplines. You've all had the opportunity to take linear algebra, and now we're going to apply your linear algebra background to BSE type problems.

**Previously we have been doing element-by-element operations. Matrix operations are a bit different and allow us to simultaneously solve systems of equations, like mass and energy balances that you might remember from BSE2004.**

If you would like to review relevant sections from BSE2004, I would suggest looking over the Engineering Calculation Algorithms section of <https://wrightrc.github.io/interactive-intro-to-BSE/units-and-calculations.html> and then the examples in <https://wrightrc.github.io/interactive-intro-to-BSE/mass-and-energy-balances.html> where we set up and solve some example systems of equations.

## Reading:

- [Primer on why](#): These 2-pages describes *why* spend time on this topic
- [Matrix Algebra overview](#): basics, notation, refresher on matrix multiplication, using inverse (e.g. eq 8.7), and converting equations to matrix form (section 8.1.3)
- Matrix Operations in R: <https://www.tutorialkart.com/r-tutorial/r-matrix/>

**Lesson: (I'm going to cover this in class, but if you want to look ahead)**

[See here](#). In class on Monday and Wednesday we will briefly cover this and work through the [examples in Posit](#).

## Exercises:

We will work through initial exercises on Monday and Wednesday [in Posit](#).

## Homework:

[Start this homework early](#) (also in Posit). I'll address questions and give hints on Wednesday.