Chem237: Lecture 13

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1 Note

9-9-19; Just copied the lecture notes I have over, this has not been reviewed/edited/made ready for the world.

Gaussian Elimination

Reduce your matrix to an upper-triangular (or lower triangular) form by performing operations such that the determinant doesn't change.

Consider the square N by N matrix $\mathbf{A}$, which has column vectors labeled $\vec{a}_i$

$$\mathbf{A} = \begin{bmatrix} A_{11} & \cdots & A_{1N} \\ \vdots & \ddots & \vdots \\ A_{1N} & \cdots & A_{NN} \end{bmatrix} = \begin{bmatrix} \vec{a}_1 & \dots & \vec{a}_N \end{bmatrix} \tag{1}$$

To compute the determinant of $\mathbf{A}$ we know the following

$$\det(\mathbf{A}) = \det(\vec{a}_1 \dots \vec{a}_N) = \det(\vec{a}_1 - \lambda_{a2}, \vec{a}_2 \dots \vec{a}_N) \tag{2}$$

Let $\lambda_1 = \frac{A_{N1}}{A_{N2}}$ then we have