COMMENTS FOR LECTURE 8 - 2.5.2010

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Matrix Multiplication.

Suppose A is a $p \times m$ matrix and B is a $m \times n$ matrix. Then we can define the product $C = AB$ as the $p \times n$ matrix such that

$$c_{ij} = a_{i1}b_{1j} + a_{i2}b_{2j} + \ldots + a_{im}b_{mj}$$

NOTE: there was a typo in the text on page 55 for formula (2.2). The sum definitely goes up to m and NOT n. So the sum should read:

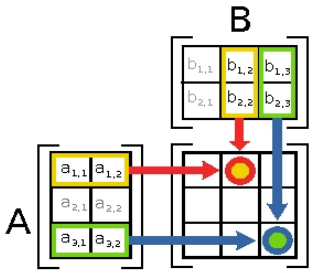
$$c_{ij} = \sum_{k=1}^{m} a_{ik}b_{kj}$$

(as we have above)
Also there is another minor typo in (2.1), it should read: $\mathbf{r}_i^{'} = a_{i1}\mathbf{r}_1 + a_{i2}\mathbf{r}_2 + \ldots + a_{im}\mathbf{r}_m$, where the prime was missing in the text).

The books has a nice way to visualize matrix multiplication (similar to the image below). Suppose for example A is a 3×2 matrix and B is a 2×3 matrix. The resulting product AB will be a 3×3 matrix such that

$$c_{ij} = a_{i1}b_{1j} + a_{i2}b_{2j}$$

as we have seen above. Visually[1]:



So for example the entry $c_{12} = a_{11}b_{12} + a_{12}b_{22}$ and the entry $c_{33} = a_{31}b_{13} + a_{32}b_{23}$.

[1] http://en.wikipedia.org/wiki/File:Matrix_multiplication_diagram_2.svg

Please read section **2.2.2 Getting used to the formula**. Understanding this product is absolutely necessary!

We really need to practice so I would recommend working through every problem from "**Exercises (15)**" on page 60-62. Most of these will be a part of homework 3.

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