Tutorial exercise for week of Monday 22nd August 2016.

- 1. Given an $m \times n$ matrix A and an $n \times k$ matrix B, the product $AB = [Av_1 \ Av_2 \ \ Av_k]$ in column form where $B = [v_1 \ v_2 \ \ v_k]$ in column form. Construct an example to illustrate this rule. The matrix A in your example should be at least 3×3 and B should be at least 3×2 .
- Suppose AB = AC, where B and C are n×k matrices and A is invertible. Show that B = C. Is this true, in general, when A is not invertible? Justify your answer (proof if true, counter-example if false).
- 3. Verify the properties of a vector space for the space R^{∞} of real sequences using the field of real numbers as the underlying field of scalars.
- 4. Verify the properties of a vector space for the space C[0,1] of continuous real-valued functions defined on the closed interval [0,1] using the field of real numbers as the underlying field of scalars. (NB: note that we can use any closed interval [a,b] as the domain for the continuous functions under consideration.)
- Verify the properties of a vector space for the space $R^{m\times n}$ of m×n matrices with real entries using the field of real numbers as the underlying field of scalars.

P. An example was done in class;

students should be able to construct

their own.

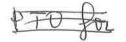
92. Suppose that A is invertible.

Then: AB = AC (given)

Multiply on the left by A-1:
A-1 (AB) = A-1 (AC)

or (A-1A)B = (A-1A)C

or B = C



(PTO)

This doesn't hold in general if A in not invertible.

For example:

A = [1 0], B = [0 0].

C = [0 0]

Thu:

AB = AC = [0 0],

but B # C

the grant the second the

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