Matrix Calculations

Assignment 1, Wednesday, Feb. 4, 2015

Exercise teachers. Recall the following split-up of students:

teacher	lecture room	email
John van de Wetering	HG00.065	wetering@cs.ru.nl
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The delivery boxes are located in the Mercator 1 building on the ground floor (where the Computer Science department ICIS is located).

Handing in your answers: There are two options, *depending on your exercise class teacher*:

1. Delivery box (default): Put your solutions in the appropriate delivery box (see above). Before putting your solutions in the box make sure:
   - your name and student number are written clearly on the document.
2. E-mail (if your teacher agrees): Send your solutions by e-mail to your exercise class teacher (see above) with subject '*assignment 1*'. This e-mail should only contain a single PDF document as attachment (unless explicitly stated otherwise). Before sending an e-mail make sure:
   - the file is a PDF document that is well readable
   - your name is part of the filename (for example MyName_assignment-1.pdf)
   - your name and student number are included in the document (since they will be printed)

Deadline: Monday, February 6, 12:00 sharp!

Goals: After completing these exercises successfully you should be able to solve simple systems of equations and perform Gauss-elimination. The total number of points is 20.

Task: Transform the following system of equations into a coefficient matrix and augmented matrix, and then into echelon form. Indicate if there are solutions, and if so, describe them. Explain briefly how you proceed.

1. **(5 points)**
$$\begin{aligned} -4x + 4y - 2z &= 4 \\ 2x - y + 2z &= 5 \\ 4x - 2y + 7z &= 16. \end{aligned}$$
2. **(5 points)**
$$\begin{aligned} x_1 - 3x_2 - 6x_3 &= 2 \\ 3x_1 - 8x_2 - 17x_3 &= -1 \\ x_1 - 4x_2 - 7x_3 &= 10 \end{aligned}$$
3. **(5 points)**
$$\begin{aligned} 2x + y + 2v + w &= 1 \\ 4x + 4y + 6v + w &= 2 \\ 6x + y + 4v + 5w &= 4 \\ 2x + 3y + 5v + w &= 4 \end{aligned}$$

4. **(5 points)**

$$\begin{aligned} x_1 + 2x_2 + 3x_3 &= 0 \\ 4x_1 + 5x_2 + 6x_3 &= 0 \\ 3x_1 + 3x_2 + 3x_3 &= 0 \\ 6x_1 + 9x_2 + 12x_3 &= 0 \end{aligned}$$