21-241 – Homework assignment week #2

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Reminder

Homework will be given on Fridays and due on the next Friday before 5pm, to me in class or in Andrew Zucker's mailbox in Wean Hall 6113. Late homework will never be accepted without a proper reason. In case of physical absence, electronic submissions by e-mail to both me and Andrew Zucker can be accepted. Please do not forget to write your name, andrew id and section and please use a staple if you have several sheets.

Reading

Michael Hutchings kindly gave us permission to use its *Introduction to mathematical arguments*, so please overview it, as it contains some additional material to my lecture notes.

Exercises (18 pts)

1. Textbook : Sec. 2.2, ex. 19, 30. (**3+3 pts**)
2. *Introduction to mathematical arguments* : p.12 ex. 1, 3 and p.21 ex. 2. (**6+3+3 pts**)

For those of you who do not have the textbook yet, sec. 2.2 ex. 19 and 30 are respectively :

1. What is wrong with the following "proof" that every matrix with at least two rows is row equivalent to a matrix with a zero row ?

   Perform $R_2 \leftarrow R_2 + R_1$ and $R_1 \leftarrow R_1 + R_2$. Now rows 1 and 2 are identical. Now perform $R_2 \leftarrow R_2 - R_1$ to obtain a row of zeros in the second row.

2. Solve the following system using either Gaussian (row echelon form) or Gauss-Jordan (reduced row echelon form) elimination :

$$\begin{cases} -x_1 + 3x_2 - 2x_3 + 4x_4 = 0 \\ 2x_1 - 6x_2 + x_3 - 2x_4 = -3 \\ x_1 - 3x_2 + 4x_3 - 8x_4 = 2 \end{cases}$$