TD 5 – LINEAR ALGEBRA

(1) Find the inverse of

$$A = \begin{pmatrix} 1 & 0 & 0 & 0 \\ \frac{1}{4} & 1 & 0 & 0 \\ \frac{1}{3} & \frac{1}{3} & 1 & 0 \\ \frac{1}{2} & \frac{1}{2} & \frac{1}{2} & 1 \end{pmatrix} .$$

(2) Prove the following statement: If A is an $n \times n$ matrix and satisfies the equation $A^3 - 4A^2 + 3A - 5I_n = 0$, then the determinant of A is non-zero. (Hint: we know that matrices with non-zero determinant are exactly the matrices with an inverse. Try to transform the given equation such that it gives a formula for the inverse.)

Please also have a look at the exercises in the mid-term exam from a previous semester (available on Moodle) to prepare yourself for the coming mid-term exam.