Linear Algebra II. Academic Year 2022-2023. Orthogonal maps. Voluntary assignment.

Let $d_1d_2d_3d_4d_5d_6d_7d_8$ be the eight digits of your DNI number[1]. For instance, if your DNI number is 32478910, then $d_1 = 3$, $d_2 = 2$, $d_3 = 4$, $d_4 = 7$, $d_5 = 8$, $d_6 = 9$, $d_7 = 1$, $d_8 = 0$.

We consider the space $\mathbb{R}^3$ with the usual scalar product and with positive orientation given by the canonical basis.

Consider the following angles (in degrees):

$$A = 30 \cdot (d_2 + 1), \quad B = 30 \cdot (d_4 + 1), \quad C = 30 \cdot (d_6 + 1)$$

1. Give the rotation matrix (in the canonical basis) of semi-axis generated by $(1, 0, 0)$ and angle of rotation A.
2. Give the rotation matrix (in the canonical basis) of semi-axis generated by $(0, 1, 0)$ and angle of rotation B.
3. Give the rotation matrix (in the canonical basis) of semi-axis generated by $(0, 0, 1)$ and angle of rotation C.
4. Give the matrix (in the canonical basis) of the transformation corresponding to the successive realization of the three previous rotations.
5. Check that the transformation described in the previous section is again a rotation. Give the semi-axis of rotation and the angle.

Rules:

- The submission of the assignment is voluntary.

- The deadline is Thursday, April 13 at 11:59 p.m.

- It will contribute a maximum of 0.5 points towards the final mark of the subject, as explained in the introductory class.

- **Only the assignments submitted on time will be considered**.

- Any indication of academic malpractice will result in disciplinary action, including not passing the course.

- In the submitted assignment you must include your name and DNI, and **keep a minimum of quality in the presentation**.

- The assignment should be submitted in PDF format through the Teams platform. **The name of the file must be "TT2-Name and surname.pdf". For example: "TT2-Luis Fuentes García.pdf"**. They will also be accepted in paper form exceptionally.

- Students may be required to present and explain the submitted assignment orally and show full knowledge of what they have written.

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[1] If the identification document has less than 8 digits, you can substitute the letters for the number 5. For example if it is $ZZ013456$ you can use 55013456.