

4.3: Exercises

Exercise 4.3.1

Write Python code to construct a 3D array of size $3 \times 3 \times 3$ corresponding to the [Levi-Civita tensor](#),

$$\varepsilon_{ijk} = \begin{cases} +1 & \text{if } (i, j, k) \text{ is } (1, 2, 3), (2, 3, 1) \text{ or } (3, 1, 2), \\ -1 & \text{if } (i, j, k) \text{ is } (3, 2, 1), (1, 3, 2) \text{ or } (2, 1, 3), \\ 0 & \text{if } i = j \text{ or } j = k \text{ or } k = i \end{cases} \quad (4.3.1)$$

Then, using the `tensor.dot` function, verify the identity $\sum_i \varepsilon_{ijk} \varepsilon_{imn} = \delta_{jm} \delta_{kn} - \delta_{jn} \delta_{km}$.

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