

## Prácticas 2, ejercicio 10h

$$\nabla \times (\underline{u} \times \underline{v}) = ?$$

En notación indicial:

$$\varepsilon_{mni} \frac{\partial}{\partial x_n} (\varepsilon_{ijk} u_j v_k) =$$

$$\varepsilon_{imn} \varepsilon_{ijk} \frac{\partial}{\partial x_n} (u_j v_k) =$$

$$(\delta_{mj} \delta_{nk} - \delta_{mk} \delta_{nj}) \left( \frac{\partial u_j}{\partial x_n} v_k + u_j \frac{\partial v_k}{\partial x_n} \right) =$$

$$\frac{\partial u_m}{\partial x_n} v_n + u_m \frac{\partial v_n}{\partial x_n} - \frac{\partial u_n}{\partial x_n} v_m - u_n \frac{\partial v_m}{\partial x_n}$$

En notación vectorial:

$$\underline{v} \cdot \nabla \underline{u} + \nabla \cdot \underline{v} \underline{u} - \nabla \cdot \underline{u} \underline{v} - \underline{u} \cdot \nabla \underline{v}$$

---