$$\underset{\sim}{\nabla \bar{u}} = \frac{\partial u_i}{\partial x_j} = \begin{pmatrix} \frac{\partial u_1}{\partial x_1} & \frac{\partial u_1}{\partial x_2} & \frac{\partial u_1}{\partial x_3} \\ \frac{\partial u_2}{\partial x_1} & \frac{\partial u_2}{\partial x_2} & \frac{\partial u_2}{\partial x_2} \\ \frac{\partial u_3}{\partial x_1} & \frac{\partial u_3}{\partial x_2} & \frac{\partial u_3}{\partial x_3} \end{pmatrix}$$

Descomposición aditiva de un tensor de 2° orden

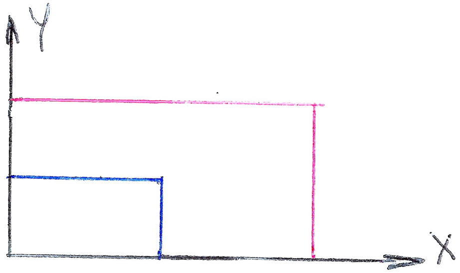
$$\underset{\sim}{A} = \underbrace{\frac{1}{2}\left(\underset{\sim}{A} + \underset{\sim}{A}^T\right)}_{\text{simétrico}} + \underbrace{\frac{1}{2}\left(\underset{\sim}{A} - \underset{\sim}{A}^T\right)}_{\text{hemisimétrico}}$$

$$\nabla^s \bar{u}_{ij} = \frac{1}{2}\left(\frac{\partial u_i}{\partial x_j} + \frac{\partial u_j}{\partial x_i}\right)$$

Ejemplo:

$u(x,y) = x$

$v(x,y) = y$




$\varepsilon_{xx} = \frac{\partial u}{\partial x} = 1$

$\varepsilon_{yy} = \frac{\partial v}{\partial y} = 1$

$\varepsilon_{xy} = 0$