EXAMPLES OF VECTOR VS TENSOR NOTATION

Quantity	Vector Notaion	Tensor Notation
Scalar	a	a
Vector	$\bar{a}$	a_i
2nd order tensor	$\bar{\bar{a}}$	a_{ij}
dot product (scalar)	$\bar{a} \cdot \bar{b}$	$a_i b_i$
cross product (vector)	$\bar{a} \times \bar{b}$	$\varepsilon_{ijk} a_j b_k$
del operator (vector)	∇	$\frac{\partial}{\partial x_i}$
gradient (vector; tensor)	$\nabla a; \nabla \bar{a}$	$\frac{\partial a}{\partial x_i}; \frac{\partial a_i}{\partial x_j}$
divergence (scalar)	$\nabla \cdot \bar{a}$	$\frac{\partial a_i}{\partial x_i}$
curl (vector)	$\nabla \times \bar{a}$	$\varepsilon_{ijk} \frac{\partial a_k}{\partial x_j}$
Laplace operator (scalar)	∇^2	$\frac{\partial^2}{\partial x_i \partial x_i}$
divergence of a 2nd order tensor	$\nabla \cdot \bar{\bar{a}}$	$\frac{\partial a_{ij}}{\partial x_i}$ (vector)
dot product: vector & del	$\bar{a} \cdot \nabla$	$a_j \frac{\partial}{\partial x_j}$ (scalar)
dot product: vector & gradient	$\bar{a} \cdot \nabla \bar{b}$	$a_j \frac{\partial b_i}{\partial x_j}$ (vector)
Material Derivative:	$\frac{\partial}{\partial t} + \bar{u} \cdot \nabla$ or $\frac{D}{Dt}$	
Vorticity: (pseudovector)	$\omega_k = \nabla \times \bar{u} = (\frac{\partial u_i}{\partial x_j} - \frac{\partial u_j}{\partial x_i}) = \varepsilon_{ijk} \frac{\partial u_k}{\partial x_j}$	
Rate of strain tensor: (2nd order tensor)	$\frac{1}{2}(\frac{\partial u_i}{\partial x_j} + \frac{\partial u_j}{\partial u_i})$	