[pex63] Viscous friction under simplified conditions

Show that the viscous-friction term in the heat transfer equation of an incompressible fluid [pln87] can be further simplified as follows:

$$\sigma': \nabla \mathbf{v} = \frac{1}{2} \eta \left(\frac{\partial v_j}{\partial r_k} + \frac{\partial v_k}{\partial r_j} \right)^2.$$

[adapted from Bruus 2008]

Solution: