C-21-2 Models in Applied Mathematics
Winter 1996
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Problem Set 1 January 9, 1996

Due January 16, 1996

1. in Lee&Segel problem 14.1.12.
2. in Lee&Segel problem 14.2.1.
3. in Lee&Segel problem 14.2.3.
4. Use the evolution equation for the total energy, $E = \frac{1}{2}\rho\mathbf{v}^2 + \rho e$,

$$\frac{d}{dt}E = \int_V \rho\, \mathbf{f}\cdot\mathbf{v}\, dV + \int_{\partial V} \mathbf{t}\cdot\mathbf{v}\, d\sigma - \int_{\partial V} \mathbf{q}\cdot d\mathbf{A}$$

   to derive that for the internal energy e,

$$\rho\,\frac{D}{Dt}e = \underline{\underline{T}} : \underline{\underline{D}} - \nabla\cdot\mathbf{q},$$

   in detail, i.e. fill in the steps skipped in class.