EN221: HW #6, Due Wednesday, 10/29.

1. Consider the motion of a deformable body described the velocity components (in the spatial description)

$$v_1 = x_2, \quad v_2 = x_1, \quad v_3 = 0 \tag{1}$$

Assume that the reference configuration of the body is chosen to be the configuration at $t = 0$, so that $\mathbf{X} = \mathbf{x}$ at $t = 0$

(a) Derive the particle path i.e $\mathbf{x}(\mathbf{X},t)$

(b) Compute the velocity components in terms of the material coordinates $\mathbf{X}$, and obtain the associated acceleration in both the material and the spatial descriptions.

(c) Since the motion is steady, the pathlines and streamlines of (4) should coincide. Derive the equations for the pathlines and streamlines separately and make sure that they are the same.

2. Problem 3, page 84, Chadwick.

3. Problem 5, page 85, Chadwick.