

1. Given the following deformation

$$\bar{x} = x + u = 1.05x \cos(\alpha) - 0.98y \sin(\alpha)$$

$$\bar{y} = y + v = 1.05x \sin(\alpha) + 0.98y \cos(\alpha)$$

$$\bar{z} = z + w = z$$

where $\alpha = 60^\circ$.

- (1). Plot the deformed shape for the cubic (0,0), (1,0), (0,1) and (1,1).
- (2). Plot the deformed shape for the unit circle ($r = 1$).
- (3). Find F .
- (4). Find R, U, V .
- (5). Find the eigenvalues for U, V .
- (6). Find the eigenvectors for U, V .
- (7). Find C, B .
- (8). Find Φ, Σ, Ψ^T .
- (9). Explain the geometric meaning for Φ, Σ, Ψ^T .
- (10). Find conventional strain tensor, Eulerian strain tensor and Lagrange tensor.