Generate a 2D mesh in a 4x4 square

The mesh is Cartesian but with a rotated subdomain (angle is 45 degrees)

Choose grid dimensions and the size of the inner circle as you wish

Part 1: Generate the grid using a suitable transformation (see next page) and then import it in gambit

Part 2: Generate the grid directly in gambit and discuss the difficulties (try to make it look like the previous one!)
Homework #2

Due May 1, 2007

This functions transform $\xi$ and $\eta$ defined on a 2x2 square in the grid nodes reported in the previous page ($\theta = 45\text{deg}$)

\[ x = \xi \cos(\theta \alpha) + \eta \sin(\theta \alpha) \]

\[ y = \eta \cos(\theta \alpha) - \xi \sin(\theta \alpha) \]

where

\[ r = \sqrt{(\xi^2 + \eta^2)} \]

\[ \alpha = 0 \quad \text{if } r > 1 \]

\[ \alpha = \min(1, 2(1 - r)) \quad \text{if } r < 1 \]