Math 331 Matlab Project #2

Consider the vibration $u(r,t)$ of the circularly symmetric membrane of radius 1, $c = 1$, initially at rest with the initial deflection $f(r)$. $u(1,t) = 0$.
Write a matlab code to visualize the solutions of the following cases:

- $f(r) = 0.1J_0(\sqrt{\lambda_3}r)$
- $f(r) = 0.1(1 - r^2)$
- $$f(r) = \begin{cases} 0.1 & \text{when } 0 < r < 1/2 \\ 0 & \text{when } 1/2 < r < 1 \end{cases}$$

For each set, only consider the first few terms.

For each set, plot the first few normal modes of the circular membrane.

For each normal mode, plot the nodal curves and determine the numerical values of the radii of the nodal curves.

Hints: $\frac{d}{dx}[x^m J_m(x)] = x^m J_{m-1}(x)$; you may also have to use integration by parts.