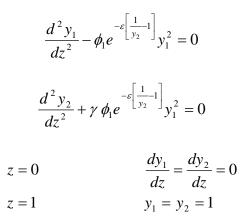
## King Fahd University of Petroleum & Minerals Chemical Engineering Department CHE 560 –Numerical Methods in Chemical Engineering 2010 - 2011 (102)

## HW#7

Due: Sunday: 15-May-2011

Consider the following system of nonlinear BVP's representing the non-isothermal reaction and diffusion in a catalytic slab:



Perform the following:

- (a) Discritize the BVP's using Chebyshev collocation method and derive the resulting residual equations.
- (b) Derive the Jacobian Matrix.
- (c) Using N = 16,  $\phi_1 = 3.0$ ,  $\varepsilon = 1$  and  $\gamma = 0.5$ , solve this problem using Code\_6-2BVPs.f and send your program by e-mail as yourname-HW7.f.