

### 3.35 Problem Set #3

Assigned: 10/14/03

Due: 10/21/03 in class

From S. Suresh, **Fatigue of Materials**

- 1: Problem 9.7
- 2: Problem 9.8
- 3: Problem 9.9
- 4: Problem 11.5

5. The critical crack-tip opening displacement of a particular cracked configuration was found to be 0.2 mm. The yield strength of the material is 450 MPa. The critical value for the J-integral was computed to be  $85000 \text{ J/m}^2$ . The elastic modulus of the material is 70GPa and its Poisson ratio is 0.3. What are the minimum specimen size requirements for a valid plane strain fracture toughness test for  $K_{IC}$  and for  $J_{IC}$ ?