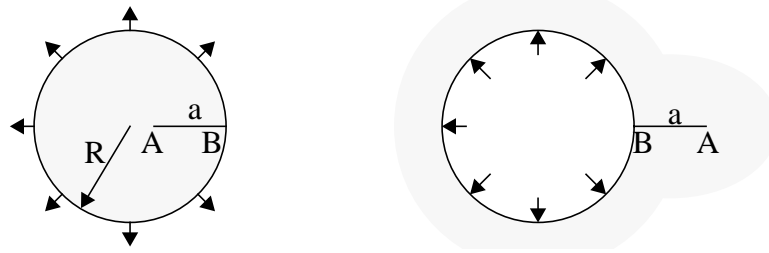


Problem: A disc under uniform tension with an edge crack (interior problem) and a pressurized hole with an edge crack (exterior problem) are shown in figure below.



Numerical Model: The circular boundary was represented by indirect BEM with force singularity. The crack was modelled by displacement discontinuity. The crack was modelled by 33 linear lagrange elements and the circular boundary by 33 linear lagrange element. Discontinuity in density function at point B was permitted.

Results: Stress intensity factors were calculated by the J-integral, least square, and crack opening displacement methods and compared with values reported in following references.

- (1) Murakami, Y. (1987). *Stress Intensity Factors Handbook*. Pergamon Press, Oxford.
- (2) Tada, H. (1973). *The Stress Analysis of Cracks Handbook*. Del Research Corporation, Hellertown, Pennsylvania.

Table 1: Non-dimensional Stress Intensity Factors for Hole with Edge Crack

a/R	Crack Opening	J-integral	Least Squares	Reference ^a
1.0	1.202	1.224	1.233	1.226
0.5	1.457	1.481	1.492	1.480
0.1	1.935	1.971	1.984	1.988

a.Murakami [1987], 242

Table 2: Non-dimensional Stress Intensity Factors for Disk with Edge Crack

a/R	Crack Opening	J-integral	Least Squares	Reference ^a
1.0	3.047	3.077	3.084	3.129
0.5	1.722	1.749	1.758	1.739
0.1	1.198	1.219	1.227	1.218

a.Tada [1973], 11.13

