Name:

Homework 2

Due 12 September 2019

1. Find the stress function or Westergaard function that solves the problem of a crack of length $2a$ in an infinite plate subjected to remote uniaxial tension. **Hint:** See if there is a small modification you can make to a known Westergaard function.

2. Show that the Westergaard function

$$Z_I = \sigma_0 \sin\left(\frac{\pi z}{2b}\right) / \sqrt{\sin^2\left(\frac{\pi z}{2b}\right) - \sin^2\left(\frac{\pi a}{2b}\right)} \tag{1}$$

is the solution for an infinite plate containing a periodic array of cracks. Determine the stress intensity factor for this problem.

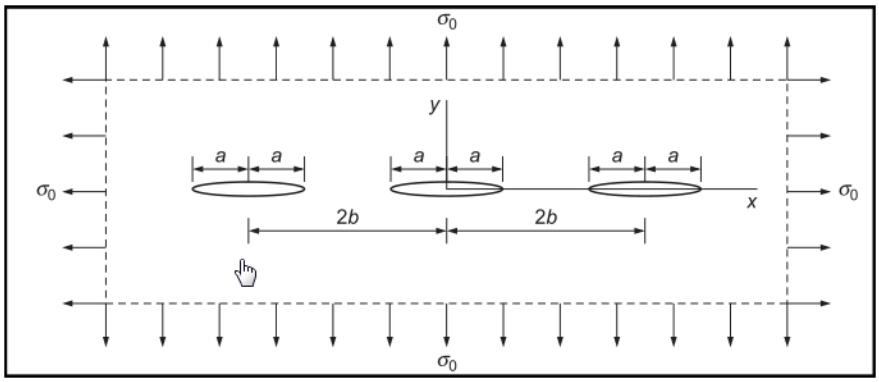

Figure 1: Illustration of Problem 2