國立台灣海洋大學河海工程研究所 BEM 第 2 次作業(2004)

1. In the course, we have shown

$$\lim_{\varepsilon \to 0} \int_{-1}^{1} \frac{1}{x^2 + \varepsilon^2} dx = -2$$

2. In calculating the hypersingular integral, we can determine the improper integral by using limiting process. The *M* kernel contains two parts, one is calculated, the other one is as follows:

$$\lim_{\varepsilon \to 0} \int_{a}^{b} \frac{2x^2}{(x^2 + \varepsilon^2)^2} dx = ?$$

Please determine the value using Symbolic software (Macsyma, Reduce, Mathematica, Maple……)