

Homework #4

Problem 2 - 1.11.5:

In class we saw that

$$\delta(g(x)) = \sum_i \frac{\delta(x - x_i)}{|g'(x_i)|}, \quad (1)$$

where x_i are the zeroes of $g(x)$. Then, in this case $g(x) = (x - x_1)(x - x_2)$ which has zeroes at $x = x_1$ and $x = x_2$ and $g'(x) = (x - x_2) + (x - x_1)$; then, $g'(x_1) = x_1 - x_2$ and $g'(x_2) = x_2 - x_1$; replacing in Eq.(1) we obtain:

$$\delta((x - x_1)(x - x_2)) = \frac{(\delta(x - x_1) + \delta(x - x_2))}{|x_1 - x_2|}. \quad (2)$$