

ECEn 560
Electromagnetic Wave Theory

Homework #12

Due Feb. 25, 2016 (may be turned in late for half credit)

1. Find an analytic function that you can integrate over a closed contour in the complex plane. Show that the result of the integral is zero. What does it mean for a function to be analytic? What are some of the ramifications of analyticity? If you don't know, look some up online.
2. (a) Evaluate the integral

$$\int_{-\infty}^{\infty} \frac{x e^{2ix}}{x^2 - 1} dx$$

using contour integration. (b) Redo with the exponential changed to e^{-2ix} .

3. (a) Evaluate the integral (table lookup or a symbolic integration package is fine)

$$I = \int_{-\infty}^{\infty} e^{ax^2}$$

(b) If a is complex, for what region in the complex plane does the integral converge?