Due: Wed Nov 23 2016 — Math Methods Homework 6

Problem 1 (10 points)

Compute the following integrals analytically. Check your results using numerical integration.

$$\int_0^{2\pi} \frac{dx}{\sin^2 x + 4\cos^2 x}, \qquad \int_{-\infty}^{\infty} \frac{dx}{(x^2+4x+13)^2}$$

Problem 2 (10 points)

Compute the following integral for $-\pi < \lambda < \pi$.

$$\int_{-\infty}^{\infty} \frac{\mathrm{e}^{\lambda x}}{\cosh \pi x}\, dx$$

Problem 3 (10 points)

Compute the following integral using contour integration:

$$J = \int_0^{\infty} \frac{(\ln x)^2}{1+x^2}\, dx\ .$$