DUE: TUESDAY FEBRUARY 15, 2011

To receive full credit for the following problems, you must exhibit the intermediate steps that lead you to your final results. Checking your answers by computer is optional.

1. The dilogarithm $\mathrm{Li}_2(x)$ is a special function defined via the following integral:

$$\mathrm{Li}_2(x) \equiv -\int_0^1 \frac{\ln(1-xt)}{t}\,dt\,.$$

(a) Expand the integrand in a power series and integrate term by term, thereby deriving the power series expansion for $\mathrm{Li}_2(x)$ about $x = 0$.

(b) Evaluate $\mathrm{Li}_2(1)$ and $\mathrm{Li}_2(-1)$ by summing the series obtained in part (a).

2. Boas, p. 88, problem 3.2–13.

3. Boas, p. 88, problem 3.2–14.

4. Boas, p. 88, problem 3.2–18.

5. Boas, p. 95, problem 3.3–2.

6. Boas, p. 95, problem 3.3–6.

7. After reviewing sections 4 and 5 in Chapter 3 of Boas, solve Boas, p. 112, problem 3.5–17.

8. Boas, p. 122, problem 3.6–6.

9. Boas, p. 122, problem 3.6–7.

10. Boas, p. 123, problem 3.6–17.

11. Boas, p. 123, problem 3.6–21. You may use the method developed in class to compute the inverse of the coefficient matrix.