

AME 60611

Homework 2

Due: Friday 2 September 2011, in class

1. Kaplan, p. 105: 2a
2. Kaplan, p. 116: 3a; plot the surface $u(x, y)$.
3. Kaplan, p. 121: 3a,b; here take x and y to be Cartesian coordinates, with u and v as non-Cartesian coordinates. Also plot lines of constant u and v in the x, y plane. On this plot, superpose contours of J , and identify the contour in which the mapping is area-preserving. Plot lines of constant x and y in the u, v plane; find the Jacobian matrix \mathbf{J} ; find the metric tensor \mathbf{G} ; find g . Is the mapping orientation-preserving?
4. Kaplan, p. 121: 6
5. Kaplan, p. 159: 5e
6. Kaplan, p. 159: 6e
7. Kaplan, p. 166: 6b
8. Kaplan, p. 210: 1a
9. Course notes: 1.16
10. Course notes: 1.17