Homework 7

Due date: May 24, 2017

Problem 1: Let $\mathbf{F} = y \cdot \mathbf{j} - z \cdot \mathbf{k}$. Let Σ be the surface consisting of the paraboloid $y = x^2 + z^2, 0 \le y \le 1$ and the disk $x^2 + z^2 \le 1, y = 1$. Find

$$\iint_{\Sigma} \mathbf{F} \cdot d\mathbf{S}.$$

Use normal vectors pointing in the positive y-direction.

Problem 2: Evaluate

$$\oint_{C} (3y - e^{\sin x})dx + (7x + \sqrt{y^4 + 1})dy,$$

where C is the circle $x^2 + y^2 = 9$.

Problem 3: Calculate the integral

$$\int_{C} (y + e^{\sqrt{x}})dx + (2x + \cos y^2)dy$$

where C is the boundary of the region enclosed by the parabolas $y = x^2$ and $x = y^2$.