

15 For lecture on 11/21

Evaluate the surface integral $\iint_S f \, dS$.

1. $f = xyz$, S is the triangle with vertices $(0,1,0)$, $(1,0,1)$, $(2,3,0)$.
2. $f = z^2$, S is the cone $z = \sqrt{3x^2 + 3y^2}$ with $1 \leq x^2 + y^2 \leq 4$.
3. $f = 2z - y + x^2$, S is the side of cylinder, whose rotation axis is the x -axis, with radius 1 and $1 \leq x \leq 2$.
4. $f = xy + 3z$, S is part of the sphere centered at original point with radius 3 in the first octant.
5. $f = 1$, S is part of the cone $z = \sqrt{x^2 + y^2}$, contained within the cylinder $y^2 + z^2 \leq 49$.
6. $f = \frac{xy}{(y^2+z^2)\sqrt{4x^2(y^2+z^2)+1}}$, S is the surface of revolution, generated by $y = e^{-x^2}$ on the xy -plane rotating about the x -axis, in the first octant and with $z \geq 1/e$.