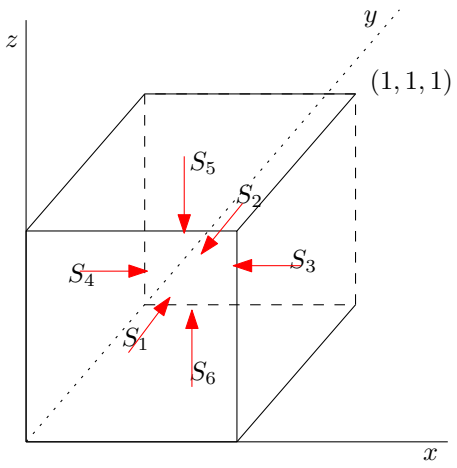
Exercises: Surface Integral by Coordinate

Problem 1. Let S be the upper side of the plane $x + y + z = 1$ with $x \geq 0$ and $y \geq 0$. Calculate $\iint_S z\, dxdy$.

Problem 2. Let S be the inner side of the cube that has the origin and the point $(1, 1, 1)$ as the opposite corners (see below). Calculate $\iint_S (z^2\, dxdy + xy\, dzdx)$.



Problem 3. Let S be the upper side of the surface $x^2 + y^2 + z^2 = 1$ with $\sqrt{2}/2 \leq z \leq \sqrt{3}/2$. Calculate $\iint_S \frac{1}{z}\, dxdy$.