Calculus 3, Semester 2, Section 5.4-5.5, Week 14

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Logistics

- All homework is due at the study session
- Graduation is right after the final exam
- 90-95% attend graduation
- oof.

Triple Integrals

$$\iiint_W f\,dV = \lim_{\Delta x, \Delta y, \Delta z \to 0} \sum f(x_i, y_j, z_k)\Delta x \Delta y \Delta z$$

Simplest explanation is hypervolume. Easier to grasp is to imagine that f is the density and the integral is the mass.

Fubini just about still exists, free to choose order. Properties still exist. Integrating 1 is the volume. Are you surprised?

Regions are hard, use pictures or you have the dumb. Projections onto planes make it easier.‘Don’t split into multiple pieces if it can be avoided.h

Coordinate Systems

Volume expansion factor instead of area, equivalent to the absolute value of the Jacobian. Fudge factor for spherical coordinates is $\rho^2 \sin\phi$. Fudge factor for cylindrical coordinates is r.