Lecture 4: Lines and planes

Math 195 Section 91

Monday June 29, 2009

Section 13.5, and 14.1 and 14.2.
parametric equation for line: $v = tw + u$. parametric equation for line segment.

1   Lines

find line through two points
  check if two lines intersect
  skew lines versus parallel lines.

2   Planes

point on plane, and vector normal to the plane
  equation: $n \cdot (v - w) = 0$ for w on the plane and n normal.
  write as scalar equation by substitting in coordinates
  find normal vector by taking cross product
  two planes are parallel if their normals are parallel
  find angle between two planes
  find distance from point to a plane

3   Calculus

vector-valued function—in coordinates, a parametric equation!
  take limits componentwise
  sketch curve: $(\cos t, \sin t, t)$.

4   Derivatives

define derivative
  take derivatives componentwise

find unit tangent vector
second derivative (on circle!)
how to differentiate: dot products, cross products. it is the leibniz rule again!

5 Integrating vectors

Indeed we can do it.