MATH 249

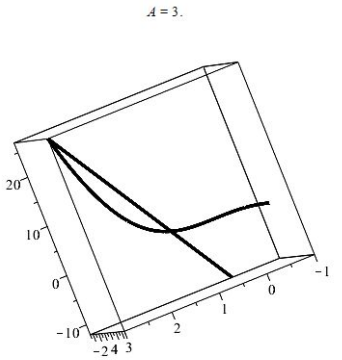
Today

1. Questions from last time
2. 13.2 Calculus on space curves (Understand how to calculate and interpret the derivative and integral of a vector-valued function)
3. WeBWorK
4. Homefun

13.2 Calculus on Vector-Valued Functions

Let $\vec{r}(t) =< f(t), g(t), h(t) >$.

1. $\vec{r}\,'(t) = \lim_{h\to 0} \dfrac{\vec{r}(t+h) - \vec{r}(t)}{h}$, provided it exists.
2. Derivatives are computed componentwise: $\vec{r}\,'(t) =< f'(t), g'(t), h'(t) >$.



3. A **smooth** curve is one given by a vvf $\vec{r}(t)$ such that $\vec{r}\,'(t)$ is continuous and nonzero.
4. See p. 826 for properties. Notice that there are **three** product rules: one for each kind of product!
5. Integrals are computed componentwise:

$$\int \vec{r}(t)dt = \left\langle \int f(t)dt, \int g(t)dt, \int h(t)dt \right\rangle.$$

6. $\displaystyle\int_a^b \vec{r}\,'(t)dt = \vec{r}(b) - \vec{r}(a)$.

7. Examples: p. 828: 3, 19, 26, 34, 31
8. WeBWorK: 13.2, #3, 4, 5, 8

Next Time

1. Watch 13.3 [$\sim$ 1:09]
2. Exam in one week!