CS 408   REVIEW

Relevant to Exam

Thurs., Apr. 20
7pm - 1:10pm

nothing before 5.

5. Interpolation (mid-term)
   - curves

6. Motion Control
      - only part: uniformly spaced pts. on B-Spline

   uniform space H, find pts

      ☆ func. A#3
               slow, fast, slow
            ease-in, ease-out
            sine
            parabolic
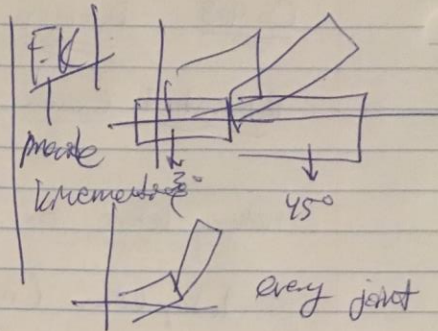
   No

   give table

   basis func. : give func.
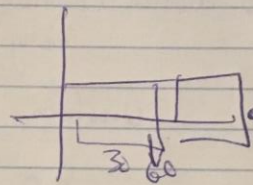
⊗ 7 Path Following

8 Hierarchical ~

models

joint
manipulator
etc.

- relevant sections
- sections related to notes
- (× keep to notes

9. Forward Kinematics

X Inverse Kinematics

(× examples of how to create tree model

Constant
var
trans.

identity node trans., var.

→ given code

schematic representation
make tree of some angle character

U?
H2.

O
ask
specifics?

Rigid Body Sim.

1. ∅
nothing about inertia tensor,
momentum

α find if object hits ground,
reflected
(equation)

0 Example

Flocking
relevant
collisions
math
Code
n^2 complexity

3 new pros? of flocking
sep
align
coh

own words = ok

Gaseous Phenomena

    KNOW how to move gas from
        one cell to another
        grid-based approach

    o what ways exist
    ⊛ do in notes
        particle methods
    2. CFD & not relevant

15. Sand / Dirt

    o Height maps
    what's a height map approach
    distribute the sand from
        neighbouring posts
        Linterpolation
        distance from that post

o relevant: skeletal animation + motion graphs
        presentation

⑴ In Class Pres. Slide

① motion capture
    └ tstbook

Skeletal animation 3
    animate figures
        └ dir char
        2 parts
        invisible skeleton
        skin

    forward kinematics: move
        skeleton → skin

        skin moves according
        → people moves

Motion Capture /8

/15 what's a motion graph
    ① use it for for?

(II) In Class Pres. Slide

① Motion capture
   └ textbook

Skeletal animation 3
   animate figures
      └ dev char
         2 parts
         invisible skeleton
         skin

   forward kinematics: move
      skeleton w/ skin

      skin moves accordingly
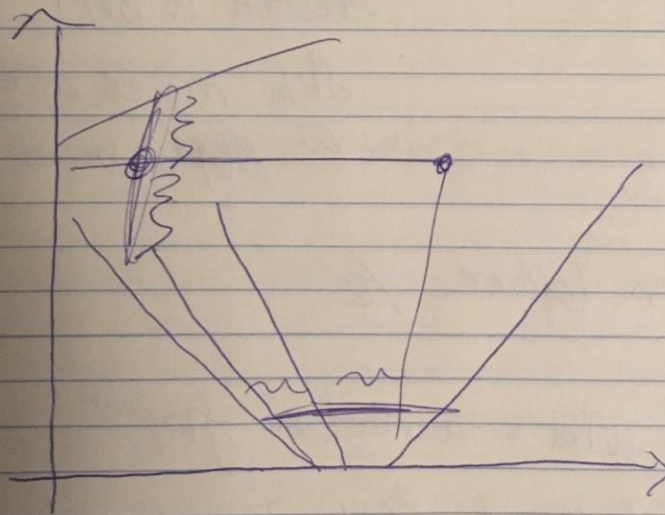   w/ people-bones

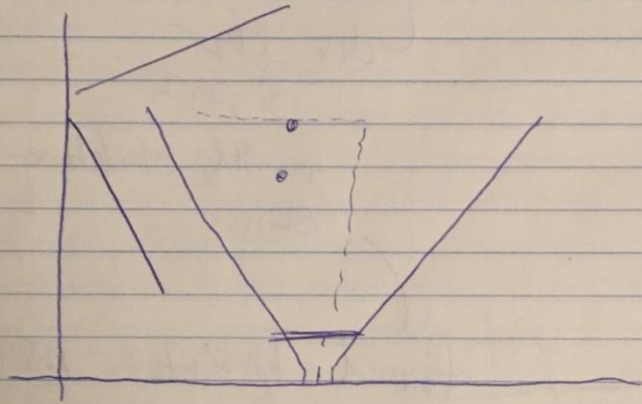Motion Capture /8

/15   what's a motion graph
      ① use it for?

motion graphs: textbook

nothing after 15.

Motion Capture 2D Example
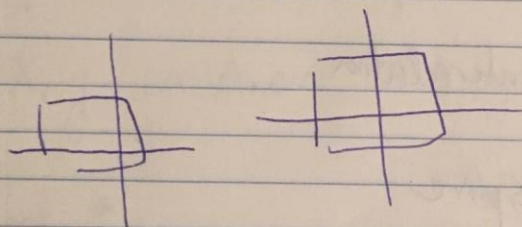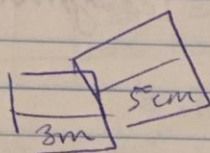

no
=

inverse kinematics

no
5

(* Curves + Motion Control

on - campus   morning
   LB 132.2 + email   (1pm - 2pm)

given values

equations (?)

U, H, etc. (?)

pseudo-code

gas = something from arguments
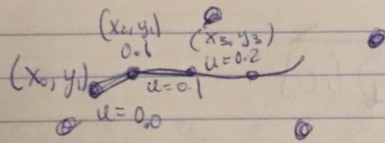
Formulas

○ know interpolation

✱ ○ - B spline
knot

$$\sum_{i=0}^{B} P_i B_i(u)$$

parameter   Arc length

U	G	H
0.0	0	0
0.1 ~~curve~~	l_1	0.09
0.2	$l_1 + l_2$	0.3
0.3		
⋮		
u=1	$G[i]$ = total Arc length	1

G/ total G = $\frac{total\ arc}{length}$

I segments: 4 central points

X, y component of x,y component on curve

(x_1, y_1) (x_3, y_3)
0.1   u=0.2
(x_0, y_0) — u=0.1
u = 0.0

Better the smaller the distance

$$l = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$$

As more curvey
less less straight

$$l_2 = \sqrt{(x_2 - x_3)^2 + (y_2 - y_3)^2}$$

now, divide curve uniformly spaced
equal intervals

⇒ divide by 10

just have # given

and u: uniform splitting

6 pts : (divide by 5)

21 pts.
↳ 20 intervals

divide by 20

#	u	$\overrightarrow{Q(u)}$
0.0	0	
0.05		
0.10		
0.01		

30 intervals
1/20

1/20 0.05
2/20 0.10
3/20 0.01
4/20 •
      :

find equal distances

interpolation 0.05 between actual table

$U = 0.0$ and $u = 0.1$

$$y = y_0 + \frac{y_2 - y_1}{x_2 - x_1} \cdot (x - x_0)$$

$$u(0.05) = 0.0 + \frac{0.1 - 0.0}{0.09 - 0.0} \overset{H\quad H}{(0.05 - 0.0)}$$

$$u = u_{[p]} + u\frac{\#[n] - \#[p]}{H[n] - H[p]} (0.05 - H[p])$$

✶ find u given H

(y)
u
0.1

0.09 $H(x)$

$$y = y_0 + \frac{y_2 - y_1}{x_2 - x_1} \cdot (x - x_0)$$

$$Q = \nearrow x \quad \overset{3}{\underset{k=0}{\sum}} P_{i+k}^x B_k(u)$$

$$\searrow y \quad \overset{3}{\underset{k=0}{\sum}} P_{y+k}^y B_k(u)$$
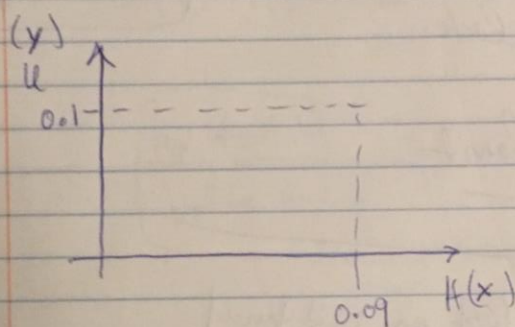
divie ArcLength into equal dis. + find u
corresponding.

$H = S$ ⇒ values

$S = 1/20$

no shaders
or
shader languages

find : interpolate
+
transport

✱ same Q. (lost on mid-term)
ease-in, ease-out

change $S = 1/20...$ sin ω in gives s
equal intervals
sin fun tells us what s is...

use polynomial eq.

Q. find 21 pts. using sine ease-in, ease-out

Rigid Body

give normal vector of a plane

vel. of obj after reflected off plane...

(A) equation $\Rightarrow$

$$V(t_i + 1) = V(t_i) - (1 + k (V(t_i) \cdot N) N$$

dot product

top #s: X
bottom #s: y