Project 2 Kinematics
EECS 287 Computer Animation

Project Title: Optimal Motion of Character Animation

1) Project Description and Goal

In this project, I used character and bvh motion file that I downloaded from "mixamo.com" and look at the resolution by using three types of rotating motion that have different speed. I used the software "Motion Buider" to change speed of the original rotating motion.
By using Zig-Zag Road (Figure 1), I looked at the time to go to each goal and the average distance from the shortest path (the path that it connected straightly from goal to goal) to character's path. As a goal to understand the the trade-off by changing the speed of motion.

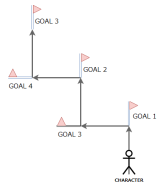

Figure 1: Zig-Zag Road and Goal Flag

2) Evaluation and Result

	ORIGINAL SPEED	HIGHER SPEED	LOWER SPEED
Average Distance	21.353	21.155	19.548
Time (unit:second)	13.025	13.687	15.112

Figure 2: Result of Average distance and Time for different speed of motion. Duration time for the original speed motion is 4.9s for 180 degree, for the higher speed motion is 9.6s for 180 degree, for the original speed motion is 2.5s for 180 degree. (This table is made by the average result of 10 implementations)

Figure 3: Trajectory of character in each motion. Left path by original speed motion, middle path by high speed motion, right path by low speed motion.

I add some code to make character position more stable when it updates to next motion without finishing all the moves. All the motion will work during the time when I am pushing the key button, and mostly stop when I release from the button.

By looking at the result table, I notice that there is not much difference between the original speed motion and high speed motion. However, I felt less stressful to use high speed motion because I can change the direction of the character very fast. So, for the low speed motion, result of average distance (Figure 2) was better than other two and also trajectory seems to be closer to the shortest path by looking at the trajectory result (Figure 3). But by using this motion, player (who manipulate the charachter) might feel stessful because of motion's slowness and it still take more time to get to the goal.

3) Conclusion

Consequently, by changing the rotating motion more slower, it will be much easier to make a accurate move that player want to do, but still it will take more time to go to the place that player wants to go so it might stress the player as well.

By comparing three types of motion, I think the high speed motion was the best. And for a better result, I should use bvh motion file that doesn't change the root position widely during it rotate.