Fitts Tilt Physics 1 Equations

Acceleration of the sphere without slipping for both the x and y axis

Where as we need to final position in inches and and where pitch and roll and the angles provided by the sensors on the android device.

Using the Kinematic Equations along with acceleration we find the velocities using the following equation

Where and are initial velocities

We then proceed to find the displacement based on the velocity

Where and are initial positions

We then lastly convert the position for inches to pixels using the pixel/inch variable built into Android

Where and are built in variables to the android device of choice

Fitts Tilt Friction Equations

For the friction equations we first check if the sphere is currently moving. We did this by check if the previous velocity was greater than zero or not. If the ball is idle than the sphere must overcome the static friction force. We found the static friction force by taking the tan of the current angle of the phone.

Where C is the friction Coefficient that user selects

Using the kinematics equations, we find the acceleration and the friction forces where as we need to final position in inches and and where pitch and roll and the angles provided by the sensors on the android device.

We then also find the friction force that is acting on the object

Using the Kinematic Equations along with acceleration and friction we find the velocities using the following equation

Where and are initial velocities using the acceleration force and and are initial velocities using the friction force

We then proceed to find the displacement based on the net velocity

Where and are initial net velocities

We then lastly convert the position for inches to pixels using the pixel/inch variable built into Android

Where and are built in variables to the android device of choice

Fitts Tilt Flicker Equations

For the Flicker state we first need to get he difference in the pixel from the start of the touch of the screen to the end and how long it took in between that time to give us initial velocity

The acceleration values are constant since the ball does stop because of the acceleration force

Where the is the coefficient of friction

We then proceed to find the displacement based on the velocity

Where and are initial velocities

After the round is completed, we update the velocities

We then lastly convert the position for inches to pixels using the pixel/inch variable built into Android

Where and are built in variables to the android device of choice