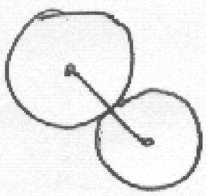
Billiard Ball Reactions

1.) Find angle of the "line of action"

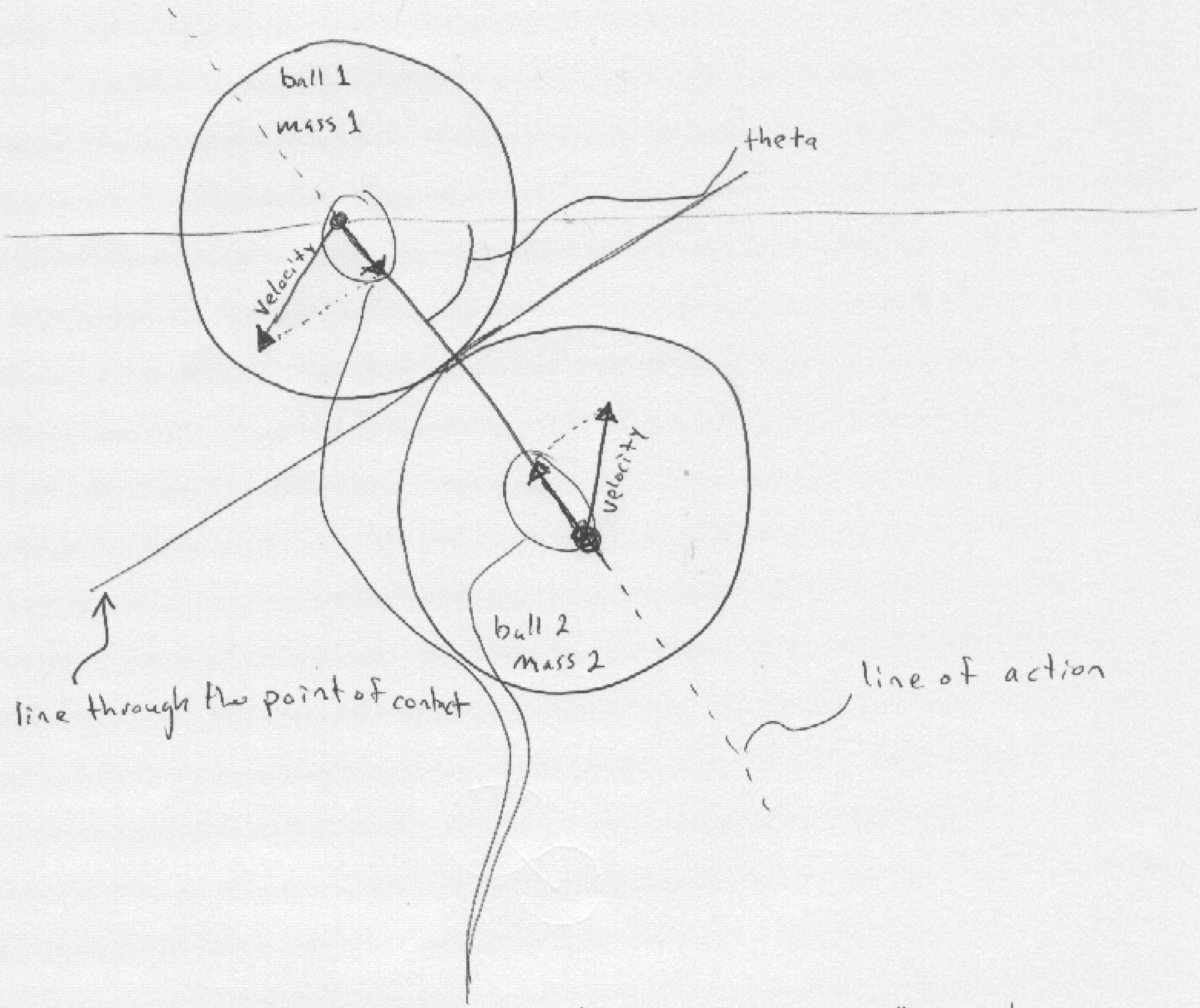
2.) project velocityes on to the line of action

3.) apply the conservation equations to the velocities that lie along the line of action

4.) use the velocities to translate back to Flash's x + y axes



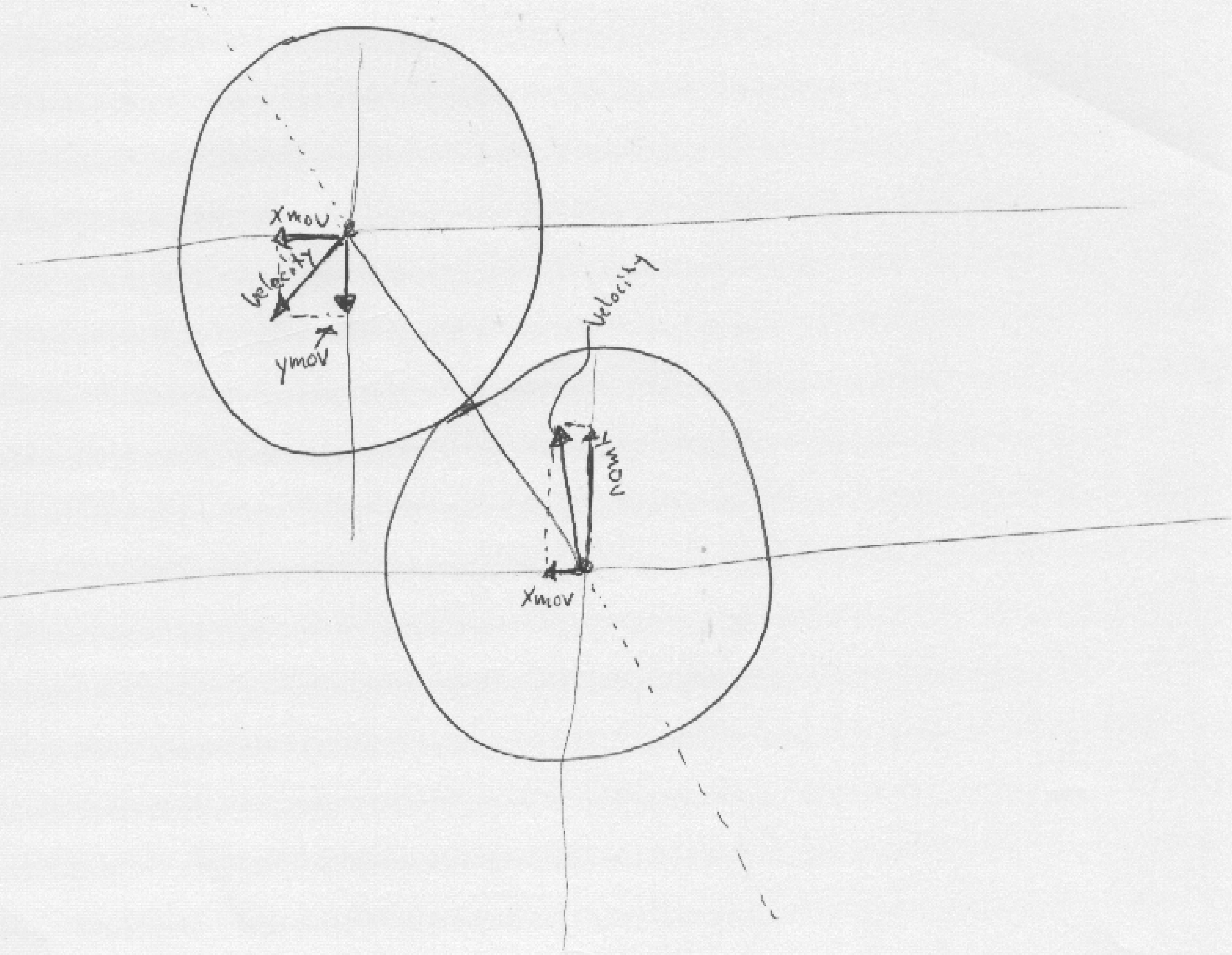
Overview



These two velocity pieces are the only ones affected by the collision. We use them in the conservation equations.

Over the next few pages we look for those pieces.

xmov and ymov for both balls

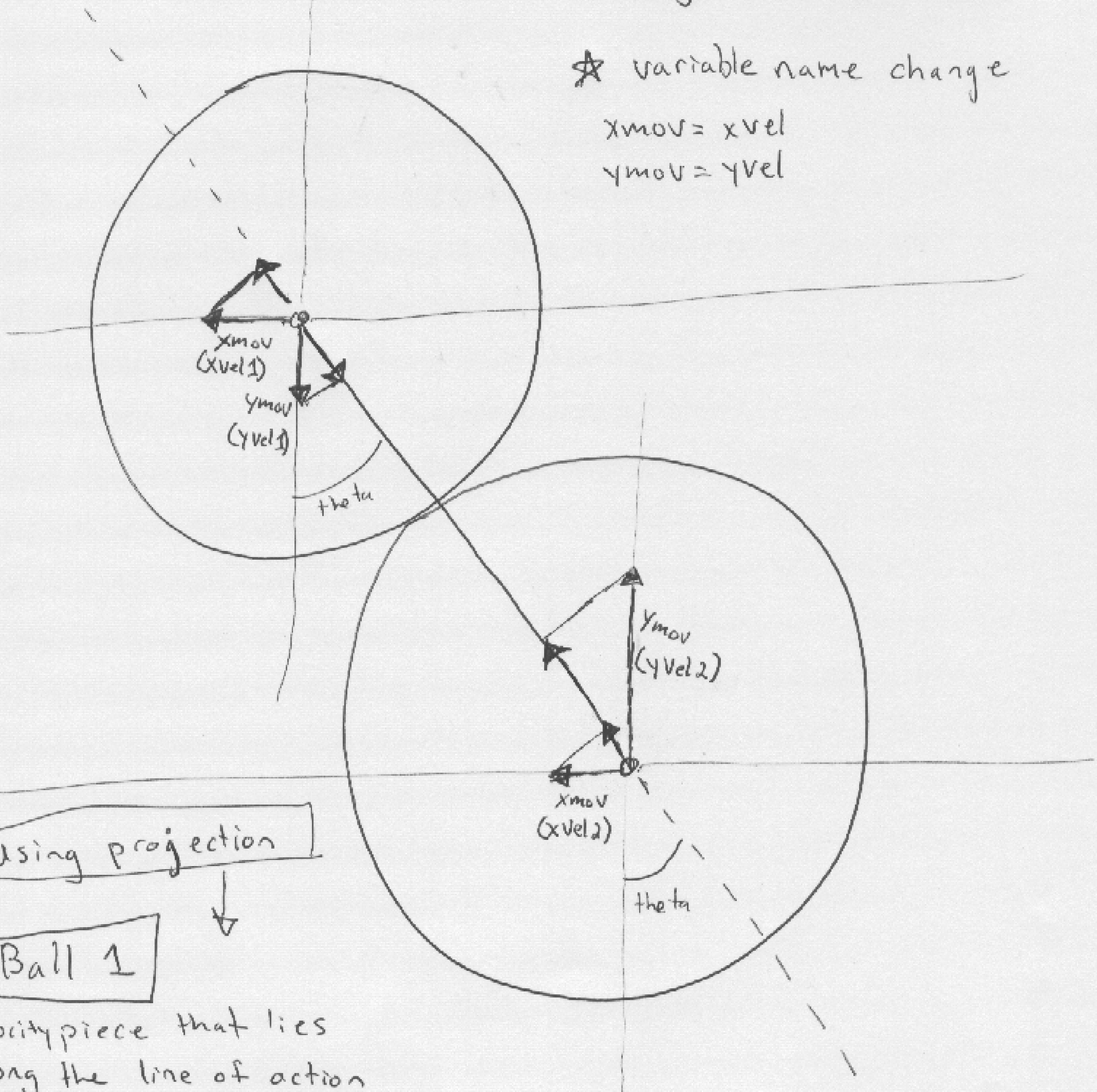


All 4 components (2 of each ball) contribute to the piece the lies along the diagonal

★ variable name change

xmov = xvel

ymov = yvel



Using projection

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Ball 1

velocity piece that lies along the line of action

$$\left[xvel1' = xvel1 \cdot \cos(theta) + yvel1 \cdot \sin(theta) \right]$$

piece perpendicular to line of action

$$\left[yvel1' = yvel1 \cdot \cos(theta) - xvel1 \cdot \sin(theta) \right]$$

next page

$\boxed{\text{Ball 2}}$

velocity piece that lies along the line of action

$$\left[xvel2' = xvel2 \cdot \cos(theta) + yvel2 \cdot \sin(theta)\right]$$

piece perpendicular to the line of action

$$\left[yvel2' = yvel2 \cdot \cos(theta) - xvel2 \cdot \sin(theta)\right]$$

Now we apply the conservation equations to xvel1', and xvel2'. See other "pdf" for details.

from that we get v1f & v2f

We must take v1f, v2f, yvel1', and yvel2' and ~~Find the~~ translate back to the Flash coordinate system.

$$\begin{cases} xvel1 = xvel1' \cdot \cos(theta) - yvel1' \cdot \sin(theta) \\ yvel1 = yvel1' \cdot \cos(theta) + xvel1' \cdot \sin(theta) \end{cases}$$

$$\begin{cases} xvel2 = xvel2' \cdot \cos(theta) - yvel2' \cdot \sin(theta) \\ yvel2 = yvel2' \cdot \cos(theta) + xvel2' \cdot \sin(theta) \end{cases}$$