PHY

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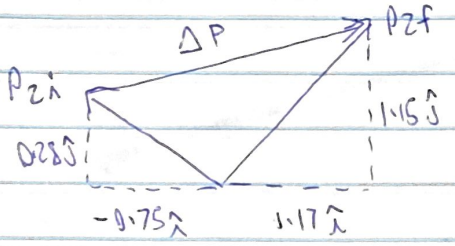
HW 8

Sphere Collisions

Let's use the momentum right before the third collision as our initial momentum.

So let's find $\Delta \vec{P}$



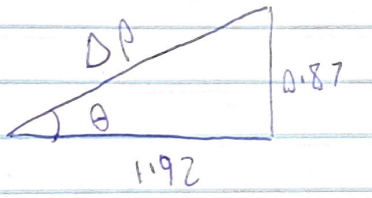
and we calculate

$\Delta p = (p_{2fx} - p_{2ix})\hat{i} + (p_{2fy} - p_{2iy})\hat{j}$

$= (1.17 - (-0.75))\hat{i} + (1.15 - 0.28)\hat{j}$

$\Delta p = 1.92\hat{i} + 0.87\hat{j}$

Let's look at ΔP



$\Delta p = \sqrt{1.92^2 + .87^2}$ $\quad \theta = \tan^{-1}(0.87/1.92)$

$\Delta p = 2.108 \text{ kgm/s}$ $\quad \theta = 24.376°$

and so we find Δp with θ.

θ is also the direction of the $\vec{F}_{1 \text{ on } 2}$ interaction force from sphere 1 on sphere 2 that changes the momentum state of sphere #2 in the 3rd collision.