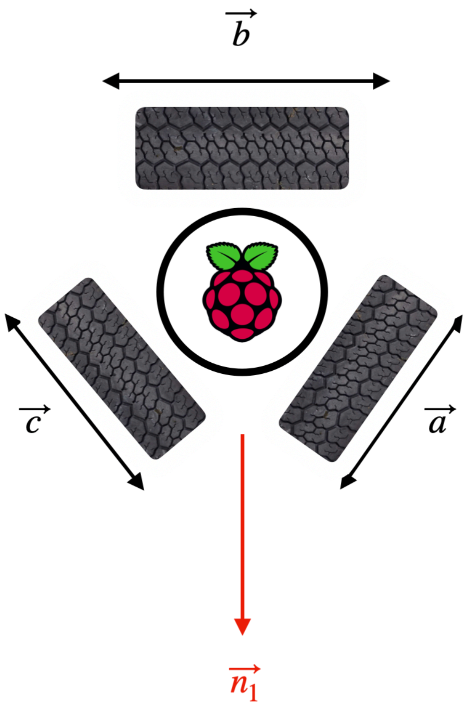


前提假設：

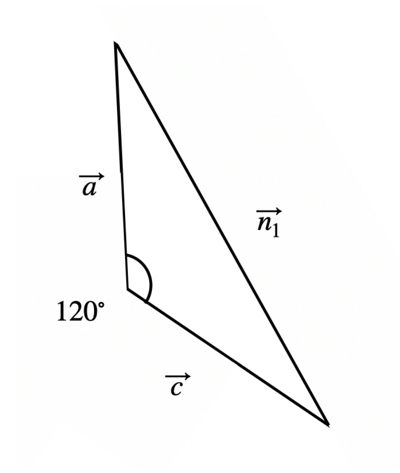
$$\begin{cases} \theta = 60^\circ \\ \overrightarrow{a} \cdot \overrightarrow{b} = \left|\overrightarrow{a}\right| \left|\overrightarrow{b}\right| cos\theta = 0.5(\left|\overrightarrow{a}\right| \left|\overrightarrow{b}\right|) \\ \overrightarrow{b} \cdot \overrightarrow{c} = \left|\overrightarrow{b}\right| \left|\overrightarrow{c}\right| cos\theta = 0.5(\left|\overrightarrow{b}\right| \left|\overrightarrow{c}\right|) \\ \overrightarrow{c} \cdot \overrightarrow{a} = \left|\overrightarrow{c}\right| \left|\overrightarrow{a}\right| cos\theta = 0.5(\left|\overrightarrow{c}\right| \left|\overrightarrow{a}\right|) \end{cases}$$

$\overrightarrow{n_1}$ 為目標動量，可控制範圍為$\overrightarrow{a}$、$\overrightarrow{c}$ ，即導出：

$$\begin{cases} \theta = 90^\circ \\ \overrightarrow{n_1} \cdot \overrightarrow{b} = \left|\overrightarrow{n_1}\right| \left|\overrightarrow{b}\right| cos\theta = 0 \Rightarrow \overrightarrow{n_1} \perp \overrightarrow{b} \\ \overrightarrow{n_1} = \overrightarrow{a} + \overrightarrow{c} \end{cases}$$

如果針對 $\overrightarrow{n_1}$ 的向量動量來解釋：

設n為方向強度，則

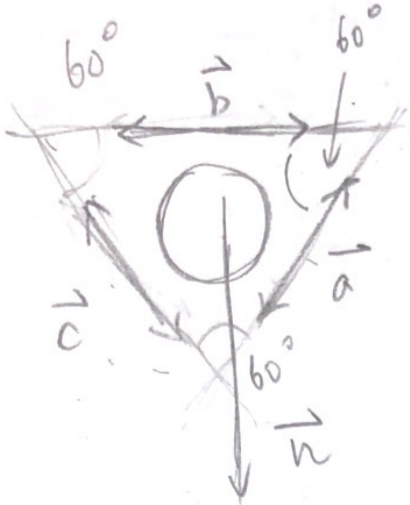


（圖一）

$$
\begin{cases}
\left|\vec{a}\right| = \left|\vec{c}\right| \\
\left|\vec{c}\right| < \left|\vec{n_1}\right| \\
\left|\vec{a}\right| < \left|\vec{n_1}\right| \\
(n \cdot \left|\vec{n_1}\right|)^2 = (n\left|\vec{a}\right|)^2| + (n\left|\vec{c}\right|)^2
\end{cases}
$$

且因為向量$\vec{a}$、$\vec{c}$為等量，且馬達的佈局是以正三角形排列。根據（圖一）所示，我們把向量整合起來，會發現$\vec{a}$與$\vec{c}$的夾角成120度，且其之頂點垂直於$\vec{n_1}$，另外其他夾角都是**30°**。得知sin的比例特性後利用畢氏定理假設出實值之比例，且利用n來修正比例值之強度。

$$
\begin{cases}
\sqrt{sin(30°)^2 + sin(30°)^2} = \sqrt{sin(120°)^2} \Rightarrow \\
\sqrt{(sin(30°)\left|\vec{a}\right|)^2 + (sin(30°)\left|\vec{c}\right|)^2} = \sqrt{(sin(120°)\left|\vec{n_1}\right|)^2} = \\
\sqrt{(0.5\left|\vec{a}\right| \cdot 1)^2 + (0.5\left|\vec{c}\right|)^2} \approx \sqrt{0.86602\left|\vec{n_1}\right|} \Rightarrow \\
\sqrt{\left|\vec{c}\right|} = \sqrt{\left|\vec{a}\right|} = (\frac{\left|\vec{n_1}\right| sin(120°)}{2})^2 \\
(\frac{\left|\vec{n_1}\right| sin(120°)}{2})^2 = \left|\vec{a}\right| = \left|\vec{c}\right|
\end{cases}
$$

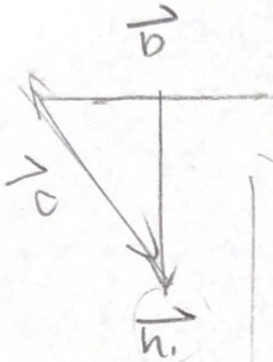


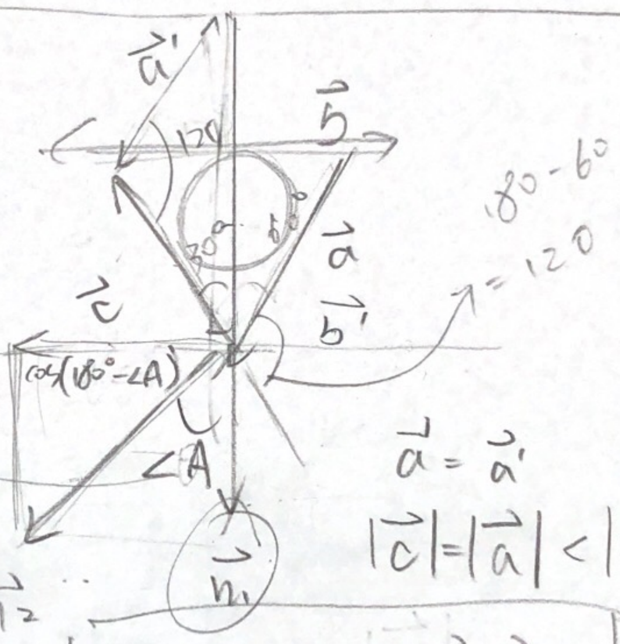
前提：

$$\begin{cases} \theta = 60 \\ \vec{a}\cdot\vec{b} = |\vec{a}||\vec{b}|\cos\theta = 0.5|\vec{a}||\vec{b}| \\ \vec{b}\cdot\vec{c} = |\vec{b}||\vec{c}|\cos\theta = 0.5|\vec{b}||\vec{c}| \\ \vec{c}\cdot\vec{a} = |\vec{c}||\vec{a}|\cos\theta = 0.5|\vec{c}||\vec{a}| \end{cases}$$

設控制 $\vec{n}$，$\vec{a}$，$\vec{c}$

$$\begin{cases} \theta = 90^\circ \\ \vec{n}_1\cdot\vec{b} = |\vec{n}_1||\vec{b}|\cos\theta = 0 \Rightarrow \vec{n}_1 \perp \vec{b} \\ \vec{n}_1 = \vec{a} + \vec{c} \end{cases}$$





$\sin(180°-\angle A)$

$\angle A = 180° - \angle A'$

$\vec{a} = \vec{a}'$

$|\vec{c}| = |\vec{a}| < |\vec{n}_1|$

$\vec{n}_2$

$$\boxed{\begin{pmatrix} n_1x \\ n_1y \end{pmatrix} = \begin{pmatrix} \vec{c}x + \vec{a}x \\ \vec{c}y + \vec{a}y \end{pmatrix}}$$

$$\vec{n}_2 = \begin{pmatrix} \cos(\angle A') \\ \sin(\angle A') \end{pmatrix} \quad \begin{cases} \vec{n}_1 = \vec{a} + \vec{c} \\ \vec{n}_1 \cdot \vec{b} = 0 \\ \Rightarrow \vec{n}_1 \perp \vec{b} \end{cases}$$

補量

$\vec{n}_2 = \vec{n}_1 + \vec{b}$

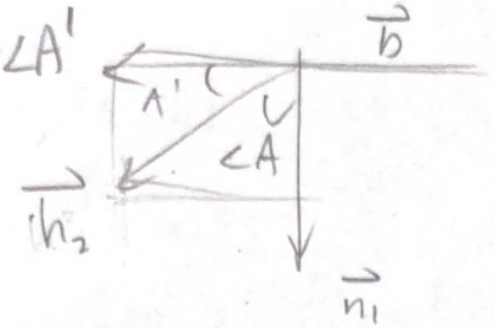
$\Rightarrow \vec{n}_1 = \vec{n}_2 - \vec{b}$

$\vec{n}_2 = \vec{n}_1 + \vec{b}$

$\vec{n}_2 = (\vec{a} + \vec{c}) + \vec{b}$

$= \vec{a} + \vec{b} + \vec{c}$

- $\angle A = 180^\circ - \angle A'$

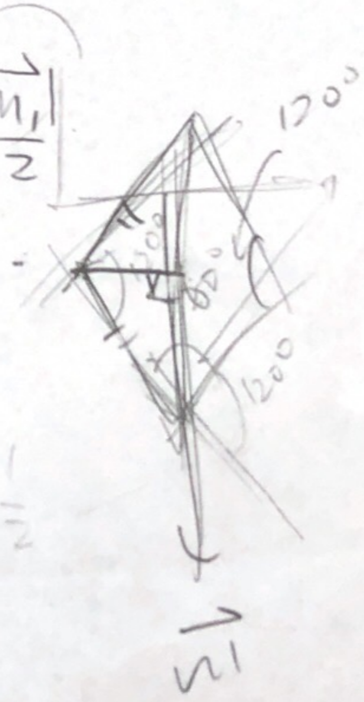


- $\vec{n_2} = \begin{pmatrix} \cos(\angle A) \\ \sin(\angle A) \end{pmatrix} = \vec{n_1} + \vec{b} = \begin{pmatrix} 0 \\ \sin(\angle A) \end{pmatrix} + \begin{pmatrix} \cos(\angle A) \\ 0 \end{pmatrix}$

$\vec{n_1} = \begin{pmatrix} 0 \\ \sin(\angle A) \end{pmatrix}$ ∠A為向量之輔角.

$\vec{b} = \begin{pmatrix} \cos(\angle A) \\ 0 \end{pmatrix}$

$\vec{n_1} = \begin{pmatrix} 0 \\ \sin(\angle A) \end{pmatrix} = \vec{a} + \vec{c}$ $\quad |\vec{a}| = |\vec{c}| = \frac{|\vec{n_1}|}{2}$



$n\vec{n_1} = n\vec{a} + n\vec{c}$

$= n(\vec{a} + \vec{c})$

$= n\left(2 \cdot \frac{\vec{n_1}}{2}\right)$

$\vec{a} = \frac{|\vec{n_1}|}{2} \times \frac{1}{n}$

n

$\vec{n_1} = \underbrace{n\left(\frac{|\vec{n_1}|}{2}\right)}_{\vec{a}} + \underbrace{n\left(\frac{|\vec{n_1}|}{2}\right)}_{\vec{c}}$