Problem 4.79 continue

M_c can be considered about any point, because it is a free moment. You can cosider O, A, or B and get the same answer. This is valid <u>just</u> when you have a couple-force :

$$\vec{M}_{couple} = \vec{M}_o = \vec{M}_1 + \vec{M}_2$$

$$= \vec{r}_{OB} \times \vec{F} + \vec{r}_{OA} \times -\vec{F}$$

$$\vec{r}_{OB} = 300\hat{i} + 200\hat{j} \quad , \quad \vec{r}_{OA} = 650\hat{i} + 400\hat{j} \ \text{mm}$$

$$\vec{M}_c = \vec{M}_o = \begin{vmatrix} i & j & k \\ 300 & 200 & 0 \\ 0 & 0 & 25 \end{vmatrix} + \begin{vmatrix} i & j & k \\ 650 & 400 & 0 \\ 0 & 0 & -25 \end{vmatrix}$$

$$= \hat{i}(200)(25) - \hat{j}(300)(25) + \hat{i}(400)(-25) - \hat{j}(650)(-25)$$

$$\vec{M}_c = 5000\hat{i} - 7500\hat{j} - 10000\hat{i} + 16250\hat{j}$$

$$\vec{M}_c = -5000\hat{i} + 8750\hat{j} \ \text{N.mm}$$

$$\boxed{\vec{M}_c = -5\hat{i} + 8.75\hat{j} \ \text{N.m}}$$

which is the same answer we got.