Problem 1.1 on Page 47

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1 Identity

On page 47 of NFCM [1], we find the identity to prove

$$[\mathbf{b} \cdot \mathbf{c} \wedge \mathbf{d}] \cdot \mathbf{a} = \mathbf{b} \cdot [(\mathbf{c} \wedge \mathbf{d}) \cdot \mathbf{a}]. \tag{1}$$

2 Proof

$$
\begin{aligned}
[\mathbf{b} \cdot \mathbf{c} \wedge \mathbf{d}] \cdot \mathbf{a} &= \mathbf{a} \cdot [\mathbf{b} \cdot \mathbf{c} \wedge \mathbf{d}] \\
&= (\mathbf{a} \wedge \mathbf{b}) \cdot (\mathbf{c} \wedge \mathbf{d}) \\
&= -(\mathbf{b} \wedge \mathbf{a}) \cdot (\mathbf{c} \wedge \mathbf{d}) \\
&= -\mathbf{b} \cdot [\mathbf{a} \cdot (\mathbf{c} \wedge \mathbf{d})] \\
&= \mathbf{b} \cdot [(\mathbf{c} \wedge \mathbf{d}) \cdot \mathbf{a}]
\end{aligned}
$$

References

[1] D. Hestenes, *New Foundations for Classical Mechanics*, 2nd Ed., Kluwer Academic Publishers, 1999.