20-P-KM-AF-027

Relative Motion : Beginner

Q: The boat A moves with a velocity of $[Ai + Bj] [kn/h]$ and boat B moves with $[Ci + Dj] [kn/h]$. What is the magnitude of the relative velocity and angle to the i axis?

A: $V_A = V_B + V_{B/A}$

$[Ai + Bj] = [Ci + Dj] + V_{B/A}$

$V_{B/A} = [(A-C)i + (B-D)j]$

$V_{B/A} = \sqrt{(A-C)^2 + (B-D)^2}$

$\tan\theta = \dfrac{(B-D)}{(A-C)}$

$\theta = \tan^{-1}\left(\dfrac{B-D}{A-C}\right)$