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California State
University, Sacramento

Contributed Posters

8:00-10:00PM, Wednesday, August 4
Union Ballroom - II

CP-DM04

Student difficulties with graphical representation of vector products: crossing and dotting beyond t's and i's*

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Abstract: Recent research [1-3] has shown that students in introductory physics courses (both algebra- and calculus-based) have significant difficulty with the graphical representation of vectors. In order to understand concepts such as work, torque, and magnetic force on a charged particle, students must have a coherent understanding of scalar products and vector products. In the last two academic semesters we have been probing students' understanding by the use of a six-question multiple-choice quiz. Early results indicate that 1/3 of students fail to recognize the fact that the scalar product of perpendicular vectors is zero. Another third of students fail to assign negative values to scalar products of two vectors with a vertex angle greater than 90 degrees. Another intriguing aspect of this poster will be to highlight some significant findings concerning the self-selecting nature of a student sample when using an online medium.

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1. R.D. Knight, Phys. Teach. 33, 74 (1995)
 2. L.G. Ortiz, P.R.L. Heron, P.S. Shaffer, and L.C. McDermott, AAPT Announcer 31 (4), 103 (2001)
 3. N-L Nguyen and D.E. Meltzer, Am. J. Phys. 71, 630 (2003)
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