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(G*) Exploring Computational Physics Exercises as a Tool for Learning Physics

Monday 19 June 2023 11:30 (15 minutes)

Over the past decade, there has been a growing recognition in the physics community of the need for students in undergraduate physics programs to develop computational skills. Not only are computational skills utilized in a wide variety of careers, but they also teach students transferrable skills such as problem solving, analysis and critical thinking. While the value of these skills is generally acknowledged, the integration of coding activities into physics courses begs the question: How does the engagement with computational activities enhance students'learning of physics? This research project seeks to investigate the benefits and challenges of using computational exercises to learn the content delivered in undergraduate physics courses. In a second-year electricity and magnetism course, students wrote python code to numerically compute vector derivatives for a variety of fields that were presented either visually or symbolically. Learning gains were investigated using pre- and post-quizzes. Additionally, interviews were conducted with students as they developed their code. This provided insights into their thought process, confidence in their code, and reconciliation of the computed results with their pre-conceptions of the divergence and curl of the vector fields explored.

Keyword-1

Computation

Keyword-2

Pedagogy

Keyword-3

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