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Student Application of Special-Case Analysis for Physics Sense-Making KELBY HAHN, PAUL EMIGH, MACKENZIE LENZ, ELIZABETH GIRE, Oregon State University — Experts often analyze their own answers to physics questions to check that they align with known results or their physical intuition about the situation. We call this strategy for physics sense-making special-case analysis. Analysis of homework from students in a sophomore mechanics class found that this same strategy is employed by students to check their answers this was followed by an in-depth analysis of what students write when they perform a special-case analysis. This analysis includes details from homework prompts where students were explicitly asked to perform a special-case analysis as well as prompts where students were asked to sense-make and chose to use special-case analysis. We found that students use varied reasoning to defend and understand the special-cases they are analyzing. Some reasoning that students use is comparable to expert use of special-case analysis. Students also appeal to alternative lines of reasoning, such as their "correct mathematics" and descriptions about the variable behavior to justify the results of their special cases.

Kelby Hahn
Oregon State University

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