GIREP-EPEC
Transforming physics learning via Research & Practice
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An inventory on the principle of relativity and the principle of equivalence in classical mechanics: investigating misconceptions and pitfalls in reasoning

Monday 30 June 2025 16:30 (1 hour)

One of the main aims of Physics education research is to identify and address student difficulties in learning physics. This study investigates student understanding of classical relativity concepts, including the Frame of Reference (FoR), Principle of Relativity (PoR), and Principle of Equivalence (PoE). We designed and administered a 22-item multiple-choice test to 200 students in introductory physics courses to probe misconceptions and deficiencies. Statistical analyses, including classical test analysis, cluster analysis, and item response theory, were employed to evaluate the test's reliability and effectiveness. Findings highlight common difficulties in understanding key concepts, providing insights for improving physics instruction

Education level

Age over 18 (excluding teacher education)

Physics topic

Other

Research focus

Student conceptions / Preconceptions / Misconceptions

Research method

Analytic Physics Education Research (Quantitative research)

Organizing preference criteria

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