



Contribution ID: 12

Type: **Poster Presentation**

The use of Mathematics Linear Graphs and Functions in understanding and interpretation of Kinematics Graphs in Physics

Tuesday, 2 October 2018 17:00 (1 minute)

Students at tertiary level seem not to be able to relate their Mathematical understanding of graphs with graphs in Physics especially from Kinematics concepts. This has resulted in most students being unable to understand and interpret Kinematics Graphs or present a clear graphical report from their Lab experiments and interpret them.

Mathematics is an essential tool in studying physics, i.e., it will be difficult to study Physics without the sound basics of Mathematics. It is even called the “language of physics” (Redish, 2005). Physicists blend conceptual physics with mathematical skills and use them to solve and interpret equations and graphs. For instance, in kinematics, different aspects from mathematics such as knowledge of functions and the solving of equations are combined with physics concepts.

Many introductory physics students perform poorly on the use of mathematical skills and interpretations of graphs in physics. Two possible reasons may be:

- Students lack the necessary mathematical skills needed to solve the physics problems.
- Students do not know how to apply and relate their mathematical skills in the context of physics.

These possible reasons were investigated in a Masters Research project, which probed first year university students’ interpretations of graphs in kinematics and in mathematics. This paper will use the idea of Beichner’s standardized questionnaire on kinematic graphs. From this questionnaire, an equivalent questionnaire was devised in the context of Mathematical equations and graphs. The responses were analysed statistically. The results of the investigation tend to indicate the deficiencies in the students’ mathematical conceptual knowledge as well as in their transfer of mathematical skills they possess to solve kinematic equations and graphs.

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Session Classification: Poster Session

Track Classification: Track D - Teaching and Learning of Physics Concepts