

Web-based Spreadsheet in Malaysian Matriculation Physics Labs

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Abstract. The world is undergoing the Fourth Industrial Revolution (IR 4.0) and this means that large scale machine-to-machine communication and the Internet of Things are starting to be integrated into the current system. To match with the demands of this internet-based future, we are proposing the integration of a web-based spreadsheet, Google Sheets into the Malaysian Matriculation Physics Laboratory. Linearity in the equations pertaining to the Malaysian Matriculation Physics curriculum allows us to easily build such spreadsheet for students' use in data analysis. In this paper, we report the structure in which we have built the spreadsheet of the experiments in the Malaysian Matriculation curriculum, the integration of the web-based spreadsheet into a Physics laboratory sessions and the students' response, which are generally encouraging.

1. Introduction

Since the introduction of modern computers, the application of it in the field of physics is well known. In fact, in Los Alamos in the 1940s, simulations of many physical systems were carried out on computers. This included, but is not limited to, the nuclear bomb and ballistics simulation [1], Monte Carlo simulations [2], and hydrodynamic simulations [3]. Even today, the cornerstone of the Industrial Revolution 4.0, of which the internet is the backbone of it, was a contribution of physicists, through the European Organization for Nuclear Research (CERN) [4]. As such, it is undeniable that the fields of physics and computer science goes hand-in-hand together.

Computational physics is well founded in Malaysia, with the likes of Professor Wan Ahmad Tajuddin of University Malaya (UM), Associate Professor Yoon Tiem Leong of *Universiti Sains Malaysia* (USM), Associate Professor Zamri Zainal Abidin (UM), it shows that the Malaysian computational physics scene is a thriving scene. In fact, Malaysia is a member of the CERN, the biggest physics experiment in the world, through the *National Centre of Particle Physics*. This is done through collaboration with CERN by students of UM. The most recent involvement of a Malaysian PhD physics student