

# Physics Through GeoGebra Window

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Lecture Proposal for the ACDCA strand

## ABSTRACT

We start seeing physics (Nature, the surrounding environment) with naked eye then we would resort to use any available device to see better and to get more insight into 'physics'. The commonly used devices are paper and pencil; one can draw figures and curves and do some calculations then draw some conclusions. But because holding a physical handle is easier than confining ourselves to the paper and pencil, we do experiments to better our understanding. Continuing this method we may design experiments that need more expenditure of time and effort. Hence we resort to the virtual world in order to see the real world. In this paper I present some virtual experiments by GeoGebra that include [the electromotive force induced in a loop](#) while entering a uniform magnetic field which first done by MATLAB and locating the focus of spherical mirrors that first done by [graphing calculator CASIO CFX-9850G](#) then continued by GeoGebra due to the efficiencies and the simplicity in using this software. Also image formation in spherical mirrors, the relation between refractive index and the deviation angle in the prism and the condition for light emergence from the prism, inclined plane that acts as a simple brachistron, [a euro that rolling around stationary euro](#), and the speed of a slipping ladder are investigated.

These experiments are more flexible than their real counterpart. For example the dimension of the spherical mirror can easily be changed to see its effect on the focus position or to see when the spherical mirror equation hold. In addition to the ease of changing the refractive index and the prism angle, The curve of relation between deviation angle with the incident angle traced simply by changing the incident angle and the user can check the arrangement that satisfy the mathematical relation that ties the two angles to the refractive index. As to the induced electromotive force it visualize the moving loop and the electric wave which inspires a relation between the wave shape and the shape of the loop – I investigated such relation for circular loop mathematically, and for trapezoidal and triangular loops only experimentally and due to their characteristics I called these virtual tools virtual signal generator. The rectangular loop is clearly stated in the textbooks as an example or an exercise.

## Keywords

Physics, virtual experiments, GeoGebra, graphing calculator, Dynamic geometry, MATLAB.