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If you have any comments, suggestions or corrections about my websites, please email

matlabvisualphysics@gmail.com

1975 - 1993

Lecturer in Science Education (Physics): Sydney Teachers College, Sydney Institute of Education, Sydney College of Advanced Education, Sydney University (Education)

1994 – 2005

Lecturer in Physics: Sydney University (Physics)

2005 – 2019

Honorary Lecturer in Physics: Sydney University (Physics)

In my retirement as a hobby of have been developing three websites on physics and mathematics for people who have an interest in physics, mathematics, engineering and computational science.

These websites were previously hosted by the School of Physics, University of Sydney at

physics.usyd.edu.au/teach_res

Thanks to **Dharam Arora** for making it possible to transfer the files to the host GitHub. Not all links have changed and some html files have been corrupted in the transfer to GitHub.

A few people have submitted articles and they have been published on my websites. All contributions would be most welcome.

The material is presented in a format suitable for viewing using the internet on a computer or tablet computer or on a mobile phone. The best viewing of the websites is by using a tablet computer in portrait mode. Often the landscape viewing mode is best for a mobile phone. The format of the documents is designed to be viewed on screen and not as a print version. The documents are either pdf documents or html files created using MS Word (using Word for html documents often results in strange formatting that is not easily corrected).

MATLAB

MATLAB is a programming platform designed specifically for engineers and scientists. The heart of MATLAB is the MATLAB language, a matrix-based language allowing the most natural expression of computational mathematics. All people interested in science and engineering including school students should be using MATLAB. You can do many computations with relative ease. All the animations and most of the graphics and plots were done using MATLAB.

<https://au.mathworks.com/discovery/what-is-matlab.html>

All my **MATLAB Scripts** can be downloaded from a public Google drive

<https://drive.google.com/drive/u/3/folders/1j09aAhfrVYpiMavajrgSvUMc89ksF9Jb>

DOING PHYSICS WITH MATLAB

<https://d-arora.github.io/Doing-Physics-With-Matlab/>

This website contains a large collection of notes and MATLAB Scripts on a wide range of topics from an elementary level to a post-graduate level. MATLAB is used as a computational tool to explore many topics in physics in a more interesting and relevant way compared to a traditional textbook approach. Each topic usually has extensive notes to accompany the Scripts.

VISUAL PHYSICS ONLINE

<https://d-arora.github.io/VisualPhysics/>

The material presented on this website is designed to support students in their preparation for their H.S.C examination for the NSW Syllabus for the Australian Curriculum: PHYSICS Stage 6.

However, the content should be helpful to all students studying physics at a school, a college or a university (first year physics).

The aim of this website is to provide material to give you an appreciation of the progress that has been made towards understanding the fundamental physical principles governing the nature of our Universe.

The material is designed to help you improve your:

1. Inquiry skills.
2. Techniques for carrying out an experiment and processing and the analysing your results.
3. Knowledge of scientific language used to describe our physical world.
4. Understanding of our physical world.
5. Appreciation of science as a human endeavour.
6. Study and problem solving skills.
7. Knowledge of the role that science has played in many technological developments that have occurred.

Physics attempts to describe and understand the nature and behaviour of the physical world around us in a fundamental and penetrating way as possible. With this knowledge physicists can make prediction about what may happen in certain situations.

For example, a person was found dead at the bottom of a cliff – did the person jump or were they throw? By making careful measurements and performing a number of experiments, it is possible using a few simple physical principles to decide if the person committed suicide or was murdered.

It is often mistakenly believed that physics deals with indisputable facts and absolute truths. Although the facts are usually indisputable, they are incomplete and since we never know all the facts about a situation we can only develop theories that are only an approximation to the truth.

Newtonian mechanics is quite adequate to describe the motion of objects that are moving relatively slowly and that is all that is needed to predict the path of a golf ball or a satellite. However, this theory breaks down and does not describe the motion of objects travelling at speeds comparable to the speed of light. For objects travelling at speeds approaching the speed of light, we need to use Einstein's Theory of Special Relativity or General Relativity.

Our present theories are only approximation to the truth. Physics is an evolving subject in which theories are modified or new theories introduced to give models that approach closer and closer to the truth but never quite attaining it.

Mobile phones, computers, tablets, high definition television, etc, etc, would not exist without our understanding of the world through the study of physics – one can easily justify the claim that the physics as a discipline is “man's greatest intellectual achievement”.

The secret of being good at physics, is to be able to visualize a physical situation and then applying physical principles.

VISUAL PHYSICS: Memory plays an important role in being good at physics. Throughout the notes on this website there are many images. It is easy to remember a picture whereas it is difficult to recall words.

When processing the notes, take time to imprint many of the pictures into your brain. It then becomes easy to attach words to the stored image. In your examinations, it is easy to recall the images and then fill in the words.

ADVANCED SCHOOL MATHEMATICS

<https://ian888cooper.github.io/advschoolmaths/>

The material presented on this website is designed to help students studying an advanced mathematics course in their final years at high school. It also might be useful for students starting a university mathematics course.

The content selected was based upon Mathematics Extension 2 Syllabus for the H.S.C examination produced by N.S.W. Board of Studies.