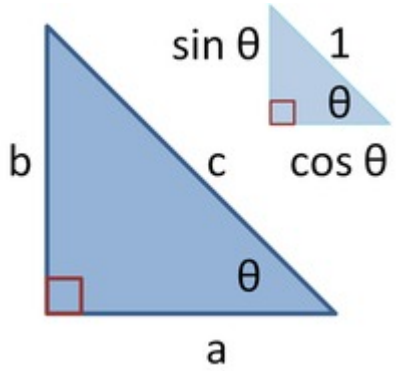
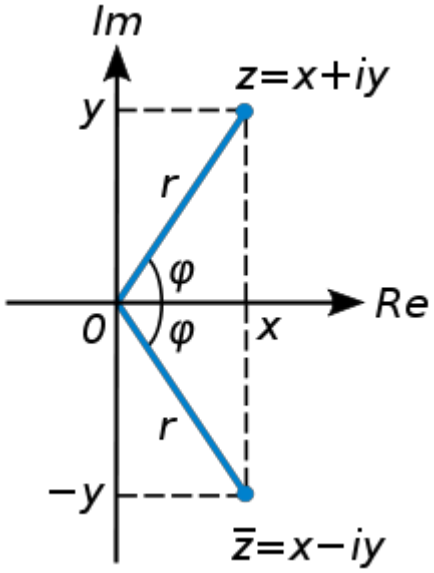
# Too dream or too hypothesise.

Too hypothesise is to understand the Pythagoras theorem, the Hypothesuse, the opposites side over the adjacent side, to give the length or angle of the hypotheses. This is an understanding that brings about and hypothesises, such that a known degree of facts or events can lead to a thought based on a problem, in this case the Pythagorean Theorem. The diagram below of Pythagoras shows the basic understanding of angles in a right angled triangle.




http://en.wikipedia.org/wiki/Pythagorean_theorem

Later on this understanding can be taken further as the child or student begins to explore into engineering, either as a profession or as a hobby. I am leading here to complex numbers, used for radio communications for impedance matching of radio antennas as well as tuned circuit impedance input and output circuit matching. This is used for both the profession of radio communications engineering and the hobby of Ham Radio “Amateur Radio”.



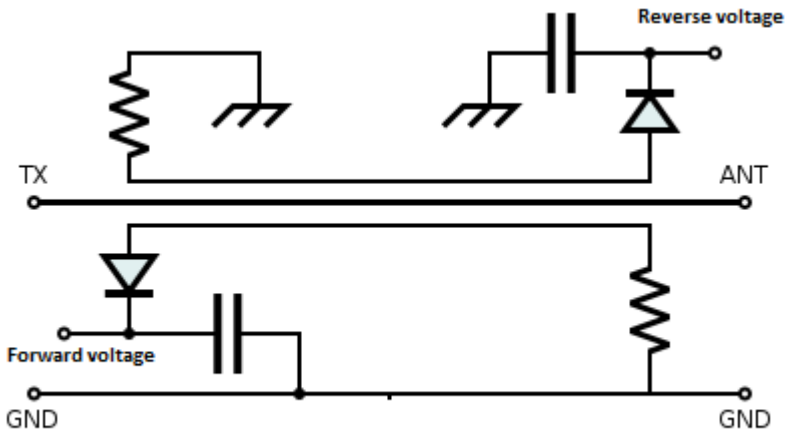

http://en.wikipedia.org/wiki/Complex_number

http://en.wikiversity.org/wiki/Electrical_impedance

The "-iy" or otherwise known as "-jy", is a capacitive load, while the "+iy" or "+jy" is an inductive loading. By using polar to rectangular conversion, the impedance and angle of the load, such as “50∠ 20” degrees, is an 50ohm impedance to an angle of 20 degrees and hence inductive, while a “50∠ -20” degrees is an 50ohm impedance to a minus 20 degree angle, thus is capacitive, which maybe a dry solder joint on a R.F. connection joint. As the "-jy" reactance is known, by relating to the frequency.

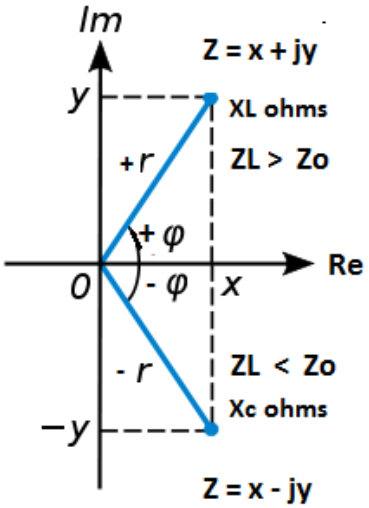
of the carrier signal, the component capacitance value maybe calculated, similarly, the inductance can be equally calculated for the positive angle of the polar co-ordinates.

So how do we get the complex impedance in the begin with, the below diagrams show such a measuring instruments.




**Basic diagram for Vswr measurements**

The subject of impedance measurement of antenna's, i.e. aerial's, is the Voltage standing wave ratio measurement. The load impedance "ZL" is the first to find, from this the fraction value or the "row" value is found. This will determine if the load impedance is greater or lower than the object impedance "Zo", the row value then negative in magnitude if the "ZL" value is less than the “Zo” design value, and positive magnitude if "ZL" is greater than "Zo".




$$ZL = Zo \frac{(V_{forward} + V_{reverse})}{(V_{forward} - V_{reverse})} \qquad \Gamma_{row} = \frac{(ZL - Zo)}{(Zo + ZL)}$$

$$V_{swr} = \frac{1 - \Gamma_{row}}{1 + \Gamma_{row}} \qquad x = r(\cos[angle]) \qquad y = r(\sin[angle])$$

$$r = SQR(X^2 + y^2) \qquad Angle = \tan^{-1}(y / x)$$

$$r = Zo = SQR(ZL^2 + (XL \text{ or } Xc)^2)$$

Should the row value be positive, then the resultant vector "+r" angle, would indicate an inductive loading, or an antenna with too a high impedance. Example, if "ZL" = 52ohms, then the vector angle is +15 degrees, while if "ZL" is 48 ohms, then the angle is -16 degrees, indicating a too lower impedance and a capacitive loading. These vector angles are relative to the 50ohms design impedance, thus the magnitude value of a polar rectangular equation.

50∠ +15 degrees: thus an inductive reactance

50∠ -16 degrees : thus an capacitive reactance

By altering the "Zo" equation to find the reactance component, the inductive "XL" or capacitive "Xc" reactance can be found. Whether the inductive or capacitive value is calculated, will be determined by the magnitude vector value, be positive or negative rotating around the X axis, will then determine the component type reactance value.

For ZL = 52ohms, the inductive reactance is 14ohms reactance : at a frequency of 14MHz, XL = 161nH or 50∠ +15 degrees

For ZL = 48ohms, the capacitive reactance is 14ohms reactance : at a frequency of 14MHz, Xc = 812pF or 50∠ -16 degrees

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When I was at school in sixth form “1979-1981”, my exposure to computers at home was the BBC micro, and also undertook “computer studies” not ICT as an “O Level”. At school I learnt both Cesal and BASIC. Cesal was used to explain the processes of a computer microprocessors internals, and for my “O Level” project in computer studies, through using the teletype terminal via a telephone 300bit Baud modem to the Guild Hall in Swansea from Gowerton School, I taught the main frame computer the card game of “pontoon”, or as it is also known, “21”.

The BBC microcomputer even today has the edge over a Laptop or PC, and also a Tablet be it an iPad or the Android equivalent. The reason is quite straight forward, neither of the modern alternatives can be program just as a BBC Microcomputer, without downloading a buying a copy of “BBC Basic for windows”. There are alternatives, but the BBC Basic for windows will also run the BBC basic programs uploaded into a PC or Laptop by connecting your BBC micro to the Laptop through the RS423 port to the USB equivalent lead.

The Raspberry PI is a new introduction to the computer home use, at $35 dollars for the model B version, it is essentially also a micro controller, self-contained and just right for school robot experiments, as well as the internal brain for a Ham Radio transceiver using also DSP technology, “DSP = Digital signal processing”.

The other way to teach computer studies is just not how to build one’s own windows operating system, but to teach electronics and computer control. The PICAXE set of chips can be programmed using just BASIC.

The bases for all this exposure is too dream, as Sir Isaac Newton through dreaming unwound the problem of why an apple falls to the ground. Here there was no previous understanding, so basic engineering and science can only be done or achieved by the imaginative, and that means to dream.