Introduction.

Mitaxi Mehta

Lecture 1

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- Each lecture will have an associated set of exercises, you don't need to do more problems than that but if you would like more practice, I suggest you look up online resources like MIT OCW, NPTEL, EDEX etc.

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- Please note that the goal of the course is to learn, not to be tested.

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- I shall regularly upload Jupyter notebooks on github for you to play with, to visualize some of the concepts learnt and to get some coding practice.

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- Final exam 50%. The last exam has the highest weight, to give you a chance to catch-up in case you have been lagging behind.

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  insults, "You Riemann zeta zero, Ziglin's theorem, Logarithm."

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A mathematician confided
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And you'll get quite a laugh
If you cut it in half,
For it stays in one piece when divided.

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- Many recreational mathematics webpages are there.

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  (a vector function of a real variable)

$$\vec{V}(t) = (V_x(t), V_y(t), V_z(t))$$

.
We shall work mainly with scalar function of one real variable.
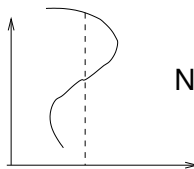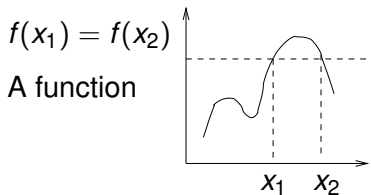
Functions of a real variable.

- Note: One input one output value. Mathematically a real function can have the same value for different values of the variable.
  i.e., $f(x_1) = f(x_2)$ is possible
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A function

Not a function

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- Give examples of (1) real functions of many real variables. (2) Complex functions of one real variable.

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  (2) Pressure P(x,y,z,t)

  (3) Intensity of light I(x,y,z,t).

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  (3) Concentrations of two chemicals in a chemical reaction
  $C(t) = C_1(t) + iC_2(t)$

- In general any two real functions (f, g) dependent on the same real variable t can be represented by a single complex function $h(t) = f(t) + ig(t)$.

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- There are special type of complex functions called analytic functions, which are very useful in applications. You shall encounter them in detail later courses.