wImportant Definitions in Analysis

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| Name | Definition |
| Metric space | A metric space is a space where X is the set S and d is the metric on X. such that for we have   1. is real valued,finite and non-negative |
| space | Set of all bounded sequences of complex numbers. If  then  Where can be a real number defined on X, and the distance metric is defined to be |
| Space | If and then  Distance metric is defined to be |
| Functional Space | Set of all real valued functions which are functions of an independent variable and are defined and continuous on a closed interval . Metric is |
| Sequence Spaces | This is a space of all (bounded and unbounded) sequence of complex numbers and is defined by  Where and Where |
| Open set | A subset M of metric space X is said to be open if every ball around point has atleast 1 element from M except from itself. |
| Topological space | Topological space is a set X and collection of subsets such that it follows  T1)  T2) The union of any members of is also a member of  T3) Intersection of finitely many members of is also a member of  Then the set is topology of *X* |
| Dense set | A subset M of X is said to be dense if where is the closure of set |
| Separable Set | X is said to be separable if it has countable subset which are dense in X. eg R as |
| Isometric Mapping | A mapping of T of X into Y is said to be isometric if it preserves distance |
| Isometric Space | A space Y is said to be isometric space with X if a bijective (1-1,onto) isometry from X to Y. |
| Homoeomorphic Spaces | T:X->Y  Two metric spaces is said to be homoeomorphic spaces if there exists a homeomorphism T st.   1. T is continuous 2. is continuous 3. is bijective |
| Convergent sequence | A sequence is said to be convergent if there exists (X,d) a such that |
| Cauchy Sequence | A sequence is said to be Cauchy or fundamental if for every st |
| Complete | A space is said to be complete if all Cauchy sequence converges. |
| Compact | A metric space X is said to be compact if every sequence in X has a convergent subsequence  A subset M of X is said to be compact if it is considered as subsequence i.e limit of convergent subsequence lies in M |
| Norm and Normed Spaces | A normed Space is a space on which norm is defined. A norm is defined to be a real valued fn on X which has following properties  N1)  N2)  N3)  N4) |
| Banach Space | A complete normed space is called a Banach Space |
| Absolute Convergence | Let be a sequence in normed space X if  converges, then the series is called absolute convergence  Absolute Convergence X is complete |
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