
WELCOME

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COMPACT SUBSETS OF THE METRIC SPACE ARE CLOSED

PROOF

Let x be a metric space.

Let k be a compact subset of the metric space x.

To prove k is closed.

(i. e) It is enough to prove k^c is open.

Let p€ X and p k and q€ k …… (1)

Let v_q and w_q are the neighbourhoods of p and q whose radius are less than

½ d (p, q).

Since k is compact, there are finitely many points q_1,q_2,………q_n€ k such that k⊂w_{q1}U w_{q2}U……Uw_{qn}.

let w=w_{q1}Uw_{q2}U….w_{qn}

Then k⊂w.

Let $V = V_{q1} \cap V_{q2} \cap \ldots\ldots \cap V_{qn}$

Where v is the neighbourhood of p and

v does not intersect k.

(i. e) $V \cap K = \Phi$

(i. e) $V \subset k^c$

From equation (1),

p€ k^c, and the neighbourhood of p, V⊂k^c.

Therefore p is an interior point of k^c.

Since p is arbitrary, k^c is open.

By the theorem

“E is open iff E^c is closed”,

Therefore K is closed.

Therefore Compact subset of the metric space are closed.