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Theorem 8. Let f, X, Y have the same meaning as in Theorem 7. Let A_f be dense in X . Then D_f is of the first category in X .

Proof. Since A_f is closed we have $A_f = X$. In view of Theorem 7 $A_f - C_f = X - C_f = D_f$ is of the first category.

Note. For metric spaces Theorem 8 is proved in [1].

Corollary. If f is cliquish then D_f is of the first category.

Note. For metric spaces, Corollary follows from the mentioned theorem in [1]. It is formulated without proof in [2] for topological spaces.

In [2] we find also a theorem asserting that if f is cliquish then it is at most pointwise discontinuous. Such a theorem for metric spaces X and Y where X is complete is evidently a corollary of Theorem 8. However, in general such a theorem is not true as the following example shows.

Example 2. (J. SMÍTAL.) Let X be the set of all rational numbers in $(0, 1)$ with the usual metric.

Put $f(x) = 1/q$ for $x = p/q$. Then f is cliquish on X but $D_f = X$.

Nevertheless, the following theorem may be proved.

Theorem 9. Let X be a topological space of the second category at each of its points. Let f be cliquish on X . Then f is at most pointwise discontinuous.

Proof. In view of Theorem 8 D_f is of the first category in X . If $U \neq \emptyset$, U is open in X then $U \subset D_f$ does not hold. Hence a point $x_0 \in U$ exists such that $x_0 \in C_f$.

References

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