Eduard Čech Accessibility and homology

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RECUEIL MATHÉMATIQUE

Accessibility and homology

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The letters F and p denote everywhere a given closed subset of the Euclidean *n*-space E_n and a given point of it.

We say that F is totally accessible in p if every neighbourhood U of p contains a neighbourhood V of p, such that D+(p) is a semicontinuum for every component D of U-F, such that

 $DV \neq 0.$

We say that F is semitotally accessible in p if, given any two neighbourhoods U and Z of p, there exists a neighbourhood V of p, such that D + (p) is a semicontinuum for every component D of U - F, such that

$$DV \neq 0 \neq D - Z.$$

We write $\alpha(p, F) = 0$ if every neighbourhood U of p contains a neighbourhood V of p, such that U-F has a finite number of components D, such that $DV \neq 0$.

We write z'(p, F) = 0 if, given any two neighbourhoods U and Z of p, there exists a neighbourhood V of p, such that U - F has a finite number of components D, such that $DV \neq 0 \neq D - Z$.

If $\alpha(p, F) = 0$, then F ist totally accessible in p; if $\alpha'(p, F) = 0$, then F is semitotally accessible in p. The converse statements are false.

It follows from the local duality theorem (Alexandroff and Cech) that the equation a(p, F) = 0 expresses a topological prorectly of the space F in the point p. The same thing is true for a'(p, F) = 0.

Alexandroff proved that the total accessibility of F in p is a topological property of F in p. The same thing is true for the semitotal accessibility.

Borsuk proved that $\alpha(p, F) = 0$ if F is loc lly contractile in every point. It is possible to prove a more general theorem. Let m designate either n-1 or n-2. Suppose that, given any $\varepsilon > 0$, there exists a $\delta > 0$ such that, if C^k is a k-cycle $(0 \le k \le m)$ situated in a compact subset S of $E_n - F$, such that $d(S) < \delta$, where d is the diameter, then there exists a compact subset T of $E_n - F$ such that $d(T) < \varepsilon$ and $C^k \frown 0$ in T. Then F is totally accessible if m = n - 1 and semitotally accessible if m = n - 2.

Let $\mu(p, F)$ denote the number of those complementary domains D of F for which D + (p) is a semicontinuum. Then the number

is a topological property of F in p.

4 Математический сборник, т. 1 (43), N. 5.

Достижимость и гомология

Э. Чех (Брно)

(Резюме)

Различные понятия достижимости ставятся в связь с локальными гомологическими свойствами, локальными теоремами двойственности и локальной стягиваемостью.
