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Kakutani S Fixed Point Theorem

The Kakutani fixed point theorem can be used to prove the minimax theorem in the theory of zero-sum games. This application was specifically discussed by Kakutani's original paper. Mathematician John Nash used the Kakutani fixed point theorem to prove a major result in game theory. Stated informally, the theorem implies the existence of a Nash equilibrium in every finite game with mixed ...

Kakutani fixed-point theorem - Wikipedia

The form of the theorem proved by Kakutani was: If $x \rightarrow \Phi(x)$ is an upper semi-continuous point-to-set mapping of an r -dimensional closed simplex S into its power set $P(S)$, then there exists $x_0 \in S$ such that $x_0 \in \Phi(x_0)$. The general scheme of Kakutani's proof may be seen

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from the one dimensional case.

Shizuo Kakutani's Fixed Point Theorem

KAKUTANI ' S FIXED POINT THEOREM Theorem: Let $X \subseteq \mathbb{R}^n$ be closed, bounded, and convex. For every $x \in X$ let $F(x)$ be a non-empty, convex subset of X . Assume that the graph of the set-valued functions is closed in $X \times X$. Then there exists a point $x^* \in X$ such that $x^* \in F(x^*)$.

KAKUTANI ' S FIXED POINT THEOREM - University of Delaware

In mathematical analysis, the Kakutani fixed-point theorem is a fixed-point theorem for set-valued functions. It provides sufficient conditions for a set-valued function defined on a convex, compact subset of a Euclidean space to have a fixed point, i.e. a point which is mapped to a set containing it.

Kakutani fixed-point theorem - Infogalactic: the planetary ...

Kakutani's fixed point theorem: It is a fixed-point theorem in mathematical analysis, the Kakutani fixed-point theorem is a fixed-point theorem... World Heritage Encyclopedia, the aggregation of the largest online encyclopedias available, and the most definitive collection ever assembled.

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Kakutani's fixed point theorem is classically equivalent to Brouwer's fixed point theorem. The constructive proof of (an approximate) Brouwer's fixed point theorem relies on a finite combinatorial argument; consequently we must restrict our attention to uniformly continuous functions.

[1611.02531] Kakutani's fixed point theorem in ...

Kakutani ' s Fixed Point Theorem is a powerful generalization of Brouwer ' s Fixed Point Theorem. It has several deep and important corollaries in economics, which include: the Arrow-Debreu theorem, which proves the existence of a general equilibrium of an economy under certain assumptions.

Kakutani ' s Fixed Point Theorem | Alexander Adam Azzam

In mathematics, the Markov–Kakutani fixed-point theorem, named after Andrey Markov and Shizuo Kakutani, states that a commuting family of continuous affine self-mappings of a compact convex subset in a locally convex topological vector space has a common fixed point.

Markov–Kakutani fixed-point theorem - Wikipedia

Kakutani ' s Fixed Point Theorem Theorem 3. (Thm. 3.4 ' . Kakutani ' s Fixed Point Theorem)

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Let $X \subseteq \mathbb{R}^n$ be a non-empty, compact, convex set and $\Gamma : X \rightarrow 2^X$ be an upper hemi-continuous correspondence with non-empty, convex, compact values. Then Γ has a fixed point in X . Proof. (sketch) Here, the idea is to use Brouwer's theorem after appropriately approximating the correspondence with a function.

Kakutani's Fixed Point Theorem Theorem 3 Thm 34 Kakutani's ...

Equivalent forms of the Brouwer fixed point theorem I Idzik, Adam, Kulpa, Władysław, and Mańkowiak, Piotr, Topological Methods in Nonlinear Analysis, 2014 Existence of Solutions of a Nonlocal Elliptic System via Galerkin Method Cabada, Alberto and Corrêa, Francisco Julio S. A., Abstract and Applied Analysis, 2012

Kakutani : A generalization of Brouwer's fixed point theorem

Kakutani theorem Let X be a non-empty compact subset of \mathbb{R}^n , let X^* be the set of its subsets, and let $f : X \rightarrow X^*$ be an upper semi-continuous mapping such that for each $x \in X$, the set $f(x)$ is non-empty, closed and convex.

Kakutani theorem - Encyclopedia of Mathematics

Section 5.3. Fixed Point Theorems: Brouwer's and Kakutani's We have already studied fixed points for the very special case of contraction mappings. Here we study them for

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general functions as well as for correspondences. Definition 1 Let X be a nonempty set and $f : X \rightarrow X$. A point $x \in X$ is a fixed point of f if $f(x) = x$.

Economics 204 Summer/Fall 2011 Section 5.3. Fixed Point ...

The following, Kakutani's fixed-point theorem for correspondences (Th. 1.10.2 in Debreu, 1959), can be derived from Brouwer's Fixed Point Theorem via a continuous selection argument.

HET: Fixed-Point Theorems

Kakutani's fixed-point theorem is quite similar to Brouwer's fixed point theorem - the main difference is that Brouwer speaks about single-valued functions and Brouwer about multi-valued functions. There is a way to go from multi-valued functions to single-valued ones - it is Michael's selection theorem.

Reducing Kakutani's fixed-point theorem to Brouwer's using ...

In order to apply the Kakutani fixed point theorem to G , we must show that G is upper semicontinuous. Since S^{n-1} is compact, we will show that the graph of G is closed. Let (y, z) be a point in $S^{n-1} \times S^{n-1}$ which does not lie on the graph of G , i.e., $z \notin G(y)$. Then there exists an open neighborhood V of z in S^{n-1} which is disjoint from $G(y)$.

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Some applications of the Kakutani fixed point theorem ...

Kakutani ' s Fixed Point Theorem Kakutani ' s xed point theorem generalizes Brouwer ' s xed point theorem in two aspects. A point-to-point mapping is generalized to point-to-set mapping, and continuous mapping is generalized to upper semi-continuous mapping. Denition 2.1.

KAKUTANI ' S FIXED POINT THEOREM AND THE MINIMAX THEOREM IN ...

Kakutani's fixed point theorem guarantees the existence of a fixed point if the following four conditions are satisfied. is compact, convex, and nonempty. is nonempty.

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