

## Kakutani S Fixed Point Theorem And The Minimax Theorem In

Kakutani fixed-point theorem | Wikipedia audio article [Wikipedia] Kakutani fixed point theorem M-04-08 Brouwer's Fixed Point Theorem Brouwer's fixed point theorem 06-2 Closed Graphs and Fixed Points of Correspondences Lecture 53/65: The Fixed Point Theorem Proving Brouwer's Fixed Point Theorem | Infinite Series Fixed Points The Kakutani - von Neumann and Chacon Transformations Part II A beautiful combinatorial proof of the Brouwer Fixed Point Theorem - Via Sperner's Lemma The Kakutani - von Neumann and Chacon Transformations Part IV Banach Fixed Point Theorem Fundamental Theorem of Algebra - Numberphile From the archives: Robert F. Kennedy on "Face the Nation" in 1967 A Simple Proof of the Brouwer Fixed Point Theorem Upper and Lower Hemicontinuity Practice: Example #1 Fixed Point Iteration Fixed point iteration method - idea and example Banach fixed point theorem Russell's Paradox using Lawvere's Fixed Point Theorem 06-1 Continuity of Correspondences 13 Fixed Point Theorem Schauder fixed-point theorem | Wikipedia audio article Algebraic Topology - 15.1 - Brouwer Fixed Point Theorem Lefschetz Fixed Point Theorem Banach Fixed Point Theorem The Brouwer Fixed Point Theorem: Why some things never change | Sean Mooney Game Theory - ACIGT - Mixed Strategy Exercises Topology \u0026amp; Analysis: winding number, big fixed point theorems, 3-25-19 part 2

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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 ...

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### Kakutani fixed-point theorem - Wikipedia

The form of the theorem proved by Kakutani was: If  $x \rightarrow (x)$  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  $x_0 \in (x_0)$ . The general scheme of Kakutani's proof may be seen from the one dimensional case.

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### Shizuo Kakutani's Fixed Point Theorem

**KAKUTANI ' S FIXED POINT THEOREM** Theorem: Let  $X \subset \mathbb{R}^n$  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  $x^* \in F(x^*)$ .

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### 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.

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

Kakutani's fixed point theorem: In mathematical analysis, the Kakutani fixed-point theorem is a fixed-point theorem f... 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 | Project Gutenberg Self ...

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.

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### [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.

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### 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.

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Markov – Kakutani fixed-point theorem - Wikipedia

Kakutani's Fixed Point Theorem Theorem 3. (Thm. 3.4'. Kakutani's Fixed Point Theorem) Let  $X \subset \mathbb{R}^n$  be a non-empty, compact, convex set and  $G : X \rightarrow 2^X$  be an upper hemi-continuous correspondence with non-empty, convex, compact values. Then  $G$  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.

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

Equivalent forms of the Brouwer fixed point theorem I Idzik, Adam, Kulpa, Włodzisław, and Mańkowski, 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

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Kakutani : A generalization of Brouwer's fixed point theorem

Kakutani theorem Let  $X$  be a non-empty compact subset of  $\mathbb{R}^n$ , let  $2^X$  be the set of its subsets, and let  $f : X \rightarrow 2^X$  be an upper semi-continuous mapping such that for each  $x \in X$ , the set  $f(x)$  is non-empty, closed and convex.

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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 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  $f(x) = x$ .

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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.

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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.

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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 fixed point theorem generalizes Brouwer's fixed 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.

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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.  $X$  is compact, convex, and nonempty.  $G$  is nonempty.

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