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PURL: https://resolver.sub.uni-goettingen.de/purl?31311157X_0104|log11 is connected. The mapping Ψ_j, $j = 1, 2, \ldots$ is an upper-semicontinuous mapping from $\mathscr{X}_{k,j}$ into the space of compact subsets of compact space $\mathscr{X}_{k,j+1}$. To prove this let $(\hat{v}_n, \hat{u}_n) \to (\hat{v}, \hat{u})$ in $\mathscr{X}_{k,j}$, $(v_n, u_n) \to (v, u)$ in $\mathscr{X}_{k,j+1}$ for $n \to \infty$ and $(v_n, u_n) \in \Psi_j(\hat{v}_n, \hat{u}_n)$ for $n = 1, 2, \ldots$. Then $v|_{\langle\sigma_0,\sigma_j\rangle} = \hat{v}$, $u|_{\langle\sigma_0,\sigma_j\rangle} = \hat{u}$ and $(v, u) \in \mathscr{X}_{k,j+1}$ i. e. $(v, u) \in \Psi_j(\hat{v}, \hat{u})$ which proves upper-semicontinuity of Ψ_j. Applying Lemma 3 we observe that the set $\mathscr{X}_{k,j+1} = \bigcup_{(\hat{v},\hat{u})\in\mathscr{X}_{k,j}} \Psi_j(\hat{v}, \hat{u})$ is connected, provided the set $\mathscr{X}_{k,j}$ is connected. The set $\mathscr{X}_{k,1}$ is connected and the principle of mathematical induction implies the connectedness of $\mathscr{X}_{k,k}$.

Since we have already proved that the set $\mathscr{X} = \bigcup_{k=1}^{\infty} \mathscr{X}_{k,k}$ is compact it follows from Lemma 1 that $\mathscr{Y} = \operatorname{Lim} \mathscr{X}_{k,k}$ is a continuum and the proof is complete.

Remark 5. Together with Kneser's theorem we have also proved the existence theorem.

References

[1] *Castaing Ch.:* Quelques problémes de mesurabilité lies à la theorie de la commande, C. R. Acad. Sc. Paris t. *262* (1966) Ser. A pp. 409—411.

[2] *Castaing Ch.:* Sur les équations differentiales multivoques, C. R. Acad. Sc. Paris t. *263* (1966) Sér. A pp. 63—66.

[3] *Dunford N., Schwartz J. T.:* Linear Operators, Part 1 (Russian), Izd. inostrannoj literatury, Moskva 1962.

[4] *Hukuhara M.:* Intégration des applications mesurables dont la valeur est un compact convexe, Funkcialaj Ekvacioj vol. 10, numero 3, decembro 1967.

[5] *Kneser H.:* Über die Lösungen eines Systems gewönlicher Differentialgleichungen das der Lipschitzen Bedingung nicht genügt, S. B. Preuss. Akad. Wiss. Phys.-Math. Kl., (1923) pp. 171—174.

[6] *Kuratowski K.:* Topology, vol. I, II (Russian), Izd. MIR, Moskva 1966.

[7] *Jarník J., Kurzweil J.:* On conditions on right hand sides of differential relations, Časopis pro pěstování matematiky *102* (1977) pp. 334—349.

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