Prof. Czesław Olech
Professor at the Institute of Mathematics of the Polish Academy of Science

Most important awards, prizes and academies

Awards: State Prize of Poland; Bernard Bolzano Golden Medal of the Czechoslovak Academy of Sciences; Martin Drinov Golden Medal of the Bulgarian Academy of Sciences; Stefan Banach Medal and Nikolaj Kopernik Medal, both of the Polish Academy of Sciences. *Academies*: Full member, Polish Academy of Sciences; Pontifical Academy of Sciences; Foreign member, Russian Academy of Sciences; Polish Academy of Arts and Sciences. *Honorary doctorate*: University of Vilnius.

Summary of scientific research

Main fields of research interest: ordinary differential equations and mathematical theory of optimal control. *Contributions to O.D.E.*: various applications of Wazewski topological method in studying asymptotic behaviour of solutions; exact estimates of exponential growth of solution of linear second order differential equations with bounded coefficients; theorems concerning global asymptotic stability of the autonomous system on the plane with stable Jacobian matrix at each point of the plane, results establishing relation between question of global asymptotic stability of an autonomous system and that of global one-to-oneness of a differentiable map; contribution to

the question whether unicity condition implies convergence of successive approximation to solutions of ordinary differential equations. *Contribution to control theory*: establishing a most general version of the so-called bang-bang principle for linear control problem by detailed study of the integral of set valued map; existence theorems for optimal control problem with unbounded controls and multidimensional cost functions; existence of solution of differential inclusions with nonconvex right-hand side; characterization of controllability of convex processes.

Main publications

Olech, C., On the asymptotic behaviour of the solutions of a system of ordinary non-linear differential equations, *Bull. Acad. Polon. Sci.*, Cl. III 4, pp. 555-61 (1956); Olech, C., Asymptotic behaviour of the solutions of second order differential equations, *Bull. Acad. Polon. Sci.*, Série des Sci. Math. Astr. et Phys., 7, pp. 319-26 (1959); Olech, C., Remarks concerning criteria for uniqueness of solutions of ordinary differential equations, *Bull. Acad. Polon. Sci.*, Série des Sci. Math. Astr. et Phys., 8, pp. 661-6 (1960); Olech, C., On the global stability of an autonomous system on the plane, *Contr. Diff. Equations*, 1, pp. 389-400 (1963); Olech, C., (with Hartman, P.) On global stability of solutions of differential equations, *Trans. Amer. Math. Sci.*, 104, pp. 154-78 (1962); Olech, C., Extremal solution of a control system, *Journal of Diff. Eq.*, 2, pp. 74-101 (1966); Olech, C. (with Plis, A.), Monotonicity assumption in uniqueness criteria for differential equations, *Coll. Math.*, 18, pp. 43-58 (1967); Olech, C., Approximation of set-valued functions by continuous functions, *Coll. Math.*, 19, pp. 285-93 (1968); Olech, C., Existence theorems for optimal problems with vector-valued cost function, *Trans. Amer. Math. Soc.*, 136, pp. 159-80 (1969); Olech, C., Existence theorems for optimal control problems involving multiple integrals, *Journal of Diff. Eq.*, 6, pp. 512-26 (1969); Olech, C. (with Kaczynski, H.), Existence of solutions of orientor fields with nonconvex right-hand side, *Annal. Polon. Math.*, 29, pp. 61-6 (1974); Olech, C. (with Frankowska, H.), Boundary solutions of differential inclusion, *Journal of Diff. Eq.*, 44 (1982); Olech, C. (with Meisters, G.), Solution of the global asymptotic stability jacobian conjecture for polynomial case, *Analyse mathématique et applications*, pp. 373-81, Gauthier-Villars (Paris, 1988).

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