

## **Fyodor L. Zak**

Head scientist  
CEMI RAS  
Of. 816, Nakhimovskii av. 47  
Moscow 117418, RF  
Tel. +7(499)7242468  
Fax +7(495)7189615  
e-mail: [zak@cemi.rssi.ru](mailto:zak@cemi.rssi.ru), [zak@mccme.ru](mailto:zak@mccme.ru)

Born in Moscow on December 2, 1949

### **Education**

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| 1966-1971 | Study at the Department of mathematics and mechanics of Moscow State University. Graduation with a diploma summa cum laude in 1971.   |
| 1971-1974 | Postgraduate studies at the Department of mathematics and mechanics of Moscow State University.   |
| 1975      | Defence of the Ph.D. thesis «q-finite morphisms and modifications of algebraic spaces». Honorary mention "summa cum laude" by the Scientific Council of the Department of Mathematics of. |
| 1987      | Defence of the D.Sc. dissertation «Tangents and secants of algebraic varieties».  |

### **Employment**

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| 1974-1981  | CEMI RAS, junior research fellow |
| 1981-1990  | CEMI RAS, senior research fellow |
| 1990-pres. | CEMI RAS, head research fellow   |
| 1992-      | NES, professor                   |
| 1995-pres. | IUM, professor                   |

Invited professor at the following universities and institutes: Genoa (1990), Bergen (1991), Trento (1991), Rome (1992), Paris-6 (1992), IHP (Paris, twice in 1995), IMJ (Paris, twice in 1997), KIAS (Korea, twice in 1998), UPS (Toulouse, 1998), UCM (Madrid, 1999), Milan (2000), KIAS (2001), Trieste (2001), ESI (Vienna, 2001), Strasbourg (2002), Catania (PRAGMATIC-2002), KIAS (2004), Nantes (2005), KAIST (Korea, 2005), KAIST (2006), Strasbourg (2006), Trieste (2006), Tokyo (2006), Texas A&M (2006), IMJ (2007, 2008-2009).

### **Scientific interests**

Theory of economic equilibrium, algebraic geometry

## Papers on mathematical economics

- ◆ «Stability of economic equilibrium», Methods of the theory of extremal problems in economics (V.L. Levin, ed.), 72-106, M., Nauka, 1981 (in Russian).
- ◆ «Economic equilibrium and stability of price adjustment», Category of social utility: problems of methodology and structurization, 51-90, M., CEMI, 1983 (in Russian).
- ◆ «Mechanism of reselling of centralized resources at flexible prices: structure and stability of equilibria», M., CEMI, 1987 (in Russian).
- ◆ «Rationing and market», ESEM-1989, Augsburg.
- ◆ «Taxation in Walrasian economy», ESEM-1991, Cambridge.
- ◆ «Inflation as a means for balancing the market in mixed economies», M., CEMI, 1991 (in Russian).
- ◆ «Sales tax and economic equilibrium», M., CEMI, 1993 (in Russian).
- ◆ «Stability of economic equilibrium», 181-216, Russian contributions to game theory and equilibrium theory, Game theory, mathematical programming and operations research 39, Springer, 2006.
- ◆ «Taxation in Walrasian economy», 2009.

## Selected papers on algebraic geometry

- ◆ «On surfaces with zero Lefschetz cycles», Mat. Zametki 13(1973), 869-880 (in Russian); English translation: Math. Notes 13(1973), 520-525.
- ◆ «On stability of birational morphisms», Uspekhi mat. nauk 29(1974), №4, 165-166 (in Russian); English translation: Russian Math. Surveys
- ◆ « $q$ -finite morphisms in formal algebraic geometry», Izvestiya AN SSSR, ser. mat. 39(1975), №1, 28-66 (in Russian); English translation: Math. USSR Izvestija 9 (1975), no.1, 27-62.
- ◆ «Deformations of modifications of algebraic spaces», Mat. Sbornik 96 (1975), №2, 212-239 (in Russian); English translation: Math. USSR Sbornik 25(1975), no.2, 199-223.
- ◆ «Projections of algebraic varieties», Mat. Sbornik 116 (1981), 593-602 (in Russian); English translation: Math. USSR Sbornik 44(1983), no.4, 535-544.
- ◆ «Varieties of small codimension arising from group actions», Addendum to: R. Lazarsfeld and A. Van de Ven, Topics in the geometry of projective space. Recent work of F.L. Zak, Birkhäuser, 1984, 41 -52.
- ◆ «Severi varieties», Mat. Sbornik 126 (1985), 115-132 (in Russian); English translation: Math. USSR Sbornik 54(1986), no.1, 113-127.
- ◆ «Linear systems of hyperplane sections on varieties of small codimension», Funkc. Analiz i ego Prilozh. 19 (1985), №3, 1-10 (in Russian); English translation: Funct. Anal. Appl. 19, no.3, 165-173.
- ◆ «Structure of Gauss maps», Funkc. Analiz i ego Prilozh. 21 (1987), №1, 39-50 (in Russian); English translation: Funct. Anal. Appl. 21, no.1, 32-41.
- ◆ «Theorems on tangency for subvarieties of complex tori», Mat. Zametki 43 (1988), №3, 382-392 (in Russian); English translation: Math. Notes 43, no.3, 219-225.
- ◆ «Some properties of dual varieties and their applications in projective geometry», Lecture Notes in Math. 1479(1991), 273-282.

- ◆ «Tangents and secants of algebraic varieties» (175pp.), Amer. Math. Soc., Providence, 1993.
- ◆ «Varieties of codegree three in projective space», Geometry of complex projective varieties, 302-320, Mediterranean Press, 1993.
- ◆ «Elementary projective geometry» (Notes by Enrico Rogora), pp. 90-120, Projective Varieties, Linear Systems, and Vector Bundles, Istituto Nazionale di Alta Matematica «F. Severi», Roma, 1994.
- ◆ «Projective invariants of quadratic embeddings», Math. Ann. 313(1999), 507-545.
- ◆ «Determinants of projective varieties and their degrees», pp. 206--238 in: Algebraic Transformation Groups and Algebraic Varieties, Encyclopaedia of Mathematical Sciences, vol. 132, Subseries Invariant Theory and Algebraic Transformation Groups, vol. III, Springer-Verlag, Berlin-Heidelberg-New York, 2004.
- ◆ «Castelnuovo bounds for higher dimensional varieties», 53pp., submitted to Ann. Math.
- ◆ «Asymptotic behaviour of numerical invariants of algebraic varieties», 16pp., submitted to J. European Math. Soc.
- ◆ «Topological structure of real and complex algebraic varieties» (with V. Kharlamov).

### **Invited talks at international conferences, lecture courses, grants**

Invited participants of numerous international conferences held in Russia, Austria, Belgium, France, Germany, Great Britain, Italy, Japan, Korea, Norway, Spain, Switzerland, United States.

Lecture courses at the Independent University of Moscow, New Economic School, universities of Bergen, Waseda (Tokyo), Catania, Complutense (Madrid), KAIST (Daejeon, Korea), Nantes, Paul Sabatier (Toulouse), Rome, Texas A&M, Ferrara (Italy), IHP (Paris, France), INAM "F. Severi" (Rome, Italy), KIAS (Seoul, Korea), summer schools at CIRM (Marseille, France), ICTP (Trieste, Italy), PRAGMATIC (Catania, Italy).

Invited talks and Colloquium talks at seminars at the universities Ann Arbor (MI, USA), Bergen, Versailles, Harvard (MA, USA), Grenoble, Valladolid (Spain), Genoa (Italy), Geneva (Switzerland), Catania (Italy), Lille, Complutense (Madrid, Spain), Milan, MIT (MA, USA), Nantes, Oslo, Paris (6, 7), Rome (Tor Vergata, Roma Tre), Seoul, Strasbourg, Texas (A&M), Tokyo (Tokyo University and Waseda University), Trento (Italy), Trieste (Italy), Tromsø, Toulouse (Paul Sabatier), Udine (Italy) et al.

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