

Conclusion

Fractal effects arising from propagation and scattering of waves in randomly inhomogeneous media are considered. Radar equation for sounding a fractal object is detailed. Models based on fractals and strange attractors for radio wave scattering by plant cover are proposed.

This research continues the cycle of studies in order to establish the application of the fractal theory, physical scaling and fractional operators in issues of radio physics and radio electronics, started by the author for the first time in the USSR at the IRE of the USSR Academy of Sciences in the late 1970s. Careful bibliographic studies prove the author's complete and absolute priority in the world in all "fractal" areas in radio physics and radio electronics. This article, together with [13], provides basic information on the current state in the application of the fractal theory and fractional calculus for innovative technologies.

Acknowledgments

Supported by the project "Leading Talents of Guangdong Province", № 00201502 (2016-2020) in the Jinan University (China, Guangzhou).

REFERENCES

- 1 Potapov A.A. *Fractals in radiophysics and radiolocation*. Moscow, Logos. 2002, 664 p.
- 2 Bunkin B.V., Reutov A.P., Potapov A.A. et al. *Issues of promising radiolocation* (joint monograph). Moscow, Radio Engineering, 2003, 512 p.
- 3 Potapov A.A. *Fractals in radiophysics and radiolocation: Sample Topology*. 2nd, revised and enlarged edition. Moscow, University Book, 2005, 848 p.
- 4 Potapov A.A. *Fractals and chaos as a basis for new innovative technologies in modern radio systems. Supplement to the book: Kronover R. (Fractals and chaos in dynamic systems*. Moscow, Technosphere, 2006. pp. 374 – 479.
- 5 Frish U. *Turbulence. Heritage of A.N. Kolmogorov*. Moscow, FASIS, 1998, 346 p.
- 6 Potapov A.A., Laktyunkin A.V. Theory of wave scattering by a fractal anisotropic surface. *Nonlinear world*. 2008, Vol. 6, No.1, pp. 1 – 36.
- 7 Potapov Alexander A. *On the Indices of Waves Scattering from the Random Fractal Anisotropic Surface. Fractal Analysis - Applications in Physics, Engineering and Technology*. Ed. Fernando Brambila. Rijeka: InTech, 2017, pp. 187 – 208.
- 8 Potapov A.A., German V.A. Effects of Deterministic Chaos and Strange Attractor in the Radar of Dynamic Systems of the Vegetative Cover Type. *Technical Physics Letters*. 2002, Vol. 28, No. 7, pp. 586 – 588.
- 9 Gonzales D., Harting S. *Designing Unmanned Systems with Greater Autonomy: Using a Federated, Partially Open Systems Architecture Approach*. Santa Monica, Calif: RAND, 2014, 96 p.
- 10 Bystrov R.P., Evozdev A.E., Nemtsov A.V., Potapov A.A., Sheremet I.B. *The current state and prospects of development of unmanned aerial vehicles of the leading states of the world*. Moscow, Central Research Institute of the Ministry of Defense of Russia. 2016, 399 p.
- 11 Potapov A.A. On the Fractal Theory Application in Adaptive Population Methods of Formation of Dynamical Groups of Unmanned Aerial Vehicles and in Processing of Incoming Information in Respect to its Effective Application Theory. *Eurasian Physical Technical Journal*. 2017, Vol. 14, No. 1(27), pp. 6 – 17.
- 12 Potapov A.A. Waves in Large Disordered Fractal Systems: Radar, Nanosystems, and Clusters of Unmanned Aerial Vehicles and Small-Size Spacecrafts. *Journal of Communications Technology and Electronics*. 2018, Vol. 63, No. 9, pp. 980 – 997.
- 13 Potapov A.A. On the issues of fractal radio electronics: Part 1. Processing of multidimensional signals, radiolocation, nanotechnology, radio-engineering elements and sensors. *Eurasian Physical Technical Journal*. 2018, Vol. 15, No. 2(30), pp. 5 – 15.