

<i>I. Research Group Heading/Name & Full Address/Affiliation.</i>
Institute of Telecommunications and Computer Science, UTP University of Science and Technology, Al. prof. S. Kaliskiego 7, 85-796 Bydgoszcz, Poland
<i>II. Name of the Group's Leader with a Short BIO (CV).</i>
Ihor Javors'kyj (Igor Jaworski, Ihor Yavorskyj) I. Javorskyj graduated from The Faculty of Physics, Lviv State University, Ukraine in 1969. Received Ph. D. in Physics and Mathematics in 1978 and postdoctoral degree in Physics and Mathematics in 1989. The title of professor in 1998. Professor of The Institute of Telecommunications and Computer Science, UTP University of Science and Technology, Bydgoszcz, Poland. Scientific interests: Theory and statistical analysis of non-stationary random processes, application of statistical methods for investigation of the probabilistic structure of stochastic oscillations of the different physical nature.
<i>III. Names of the Group's Members, and Their Research Areas/Interests.</i>
1. Jacek Majewski, Ph. D. in Telecommunications, Scientific interests: optical fibers, wireless telecommunications, signal theory, signal processing. 2. Zbigniew Zakrzewski, Ph. D. in Telecommunications, Scientific interests: optical fibers, wireless telecommunications, signal theory, signal processing and microwave – photonic techniques.
<i>IV. Leading Research Topic of the Group.</i>
Theory and methods of statistics for periodically and almost periodically non-stationary (cyclostationary) random processes (PNRP and APNRP) and their applications. The analysis of the properties of the stochastic oscillations within the framework of spectral – correlation theory of PNRP and APNRP. The development of the method for estimation of the whole complex of the PNRP and APNRP – characteristic of the first and second order of the base of experimental data (coherent, component, least square method and linear oscillation methods) for known and unknown of non-stationary periods. The development of searching for hidden periodicities, which are described by PNRP and APNRP. The investigation and parametric description of the rhythmical structure of different physical phenomena.
<i>V. Best Realizations of the Main Research Topic (Brief Characteristics or Description).</i>
Applications of the developed methods of stochastic oscillation analysis for early diagnosis of mechanical system elements: rolling, sliding, bearing, gearboxes.
<i>VI. General Expression of Interests.</i>
Theory of stochastic oscillation and their analysis, signal processing.
<i>VII. Specific Interests and Additional Topics of Extended Interest.</i>
The applications of the theory and methods of PNRP analysis for telecommunications problems.
<i>VIII. Other Important Characteristics of the Group.</i>
Cross-correlation and cross spectral analysis of PN random signals.
<i>IX. Main Group's Achievements.</i>
The development of theory and statistical method for PNRP and APNRP analysis and their application for early fault detection in mechanical system elements.

X. Max. 5 Best Selected Publications and/or Other Relevant Accomplishments.

1. I. Jaworskyj, I. Isayev, Z. Zakrzewski, S.P. Brooks *Coherent covariance analysis of periodically correlated random processes*, Signal Processing 8 (1) (2007), pp. 13-32.
2. I. Jaworskyj, I. Isayev, J. Majewski, R. Yuzefovych, *Component covariance analysis for periodically correlated random processes*, Signal Processing, Volume 90 Issue 4 (2010), pp. 1083-1102.
3. I. Jaworskyj, D. Dehay, I. Kravets, *Component statistical analysis of second order hidden periodicities*, Digital Signal Processing Volume 26 (2014), pp. 50-70.
4. I. Jaworskyj, I. Matsko, R. Yuzefovych, Z. Zakrzewski, *Discrete estimators of characteristics for periodically correlated time series* Digital Signal Processing Volume 53 (2016), pp. 25-40.
5. I. Jaworskyj, I. Kravets, I. Matsko, R. Yuzefovych, *Periodically correlated random processes: application in early diagnostics of mechanical systems*, Mechanical systems and signal Processing 83 (2017), pp. 406 – 438.