

**STUDY ON LONG-TERM CHANGES IN THE
ELECTROMAGNETIC ENVIRONMENT USING
DATA FROM A CONTINUOUS MONITORING
SENSOR**

Ileana-Roxana TUTELCĂ

Abstract. With the proliferation of base stations through mobile telephony development projects, as well as the diversification of telecommunications services, medical technology, and household appliances, there has been increasing concern among the population regarding the excessive use of electromagnetic fields. This concern is also due to the absence of direct perception of electromagnetic phenomena. The perception of the presence of a high-intensity electromagnetic field is indirect, through mechanical, thermal, optical, and acoustic effects. This paper aims to analyze the evolution of the electromagnetic field in the environment and consequently human exposure to it over a one-year period, from September 2022 to September 2023. The study is based on data collected from a non-ionizing radiation monitoring sensor in Timișoara. We used the Holt-Winters and ARIMA methods for analysis and prediction, and since the sensor includes frequency filters for separating received frequencies, we analyzed three frequencies and a wide band. The study shows a fluctuation over time of the electromagnetic field, without exceeding the reference level according to OMS 1193/2006.

Keywords and phrases: electric, electromagnetic, frequency, OMS, prediction

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**A COMPARISON OF AMBIENT
RADIOFREQUENCY ELECTROMAGNETIC
FIELD (RF-EMF) LEVELS IN DIFFERENT
OUTDOOR AREAS IN ROMANIA**

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Abstract. The recent development of wireless communications in Romania has caused concerns among the population regarding how it can affect health. ANCOM has implemented a nationwide monitoring network of electromagnetic emissions with sensors located in over 100 localities that collect data on the ambient level of the electric field. Until now, there has not been an evaluation of this information at the

national level and the present work pursues three objectives using data collected over a period of 12 months, from a sample of 44 localities from all historical regions.

The first objective is to establish average values of the electric field level over a wide area in Romania and comparing it with the reference level in the public health legislation.

The second objective is to make some comparisons between the annual averages of the electric field level in four groups of 11 localities established on the population density criterion.

The third objective is the verification of a supposed increase in the electric field level with the implementation of 5G technology. Using statistical evaluation methods, the results obtained show an average level of exposure for the 44 localities of 5.78 % of the maximum exposure limit established by OMS1163/2006, the statistical hypothesis regarding the homogeneity of the average values of the electric field for the four groups of localities cannot be rejected either. Multivariate analysis of broadband electric field level composition data cannot demonstrate a greater contribution of the level generated by the deployment of 5G technology.

Keywords and phrases: uniform h-dichotomy, uniform exponential dichotomy, skew-evolution cocycles.

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ANALYSIS OF STATISTICAL METHODS APPLIED IN THE STUDY OF CARDIAC PATHOLOGY

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Abstract. This article explores the application of correlation and regression statistical methods in cardiac pathology. The aim of this study is to identify and analyze the relationships between various cardiac parameters to improve the understanding and management of heart diseases.

The research utilizes a comprehensive dataset, including variables such as ejection fraction, age, QRS duration, end-diastolic volume, end-systolic volume, interventricular septum thickness, left ventricular end-diastolic diameter, systolic pulmonary artery pressure, and left atrial volume. The analysis focuses on descriptive statistics, correlation matrices, and regression models to highlight significant associations among these parameters.

Key findings reveal strong negative correlations between ejection fraction and both end-diastolic and end-systolic volumes, indicating that higher ejection fractions are associated with smaller volumes. Additionally, the study identifies moderate positive correlations between QRS duration and both interventricular septum thickness and left ventricular end-diastolic diameter.

These relationships emphasize the interdependence between the heart's electrical and structural characteristics. The research also employs graphical visualizations to facilitate the interpretation and communication of results, thereby contributing to a better understanding of the complexity of cardiac pathology and improving diagnostic and therapeutic approaches in this field.

Keywords and phrases: cardiac pathology, statistical correlation, regression, ejection fraction.

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