

# **SEMI-EMPIRICAL MATHEMATICAL MODEL FOR TRANS-IONOSPHERIC PARAMETERS OVER MIDDLE EAST REGION**

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## **ABSTRACT**

In this paper, the variation of the ionospheric parameters (Maximum Usable Frequency (MUF) and Optimum Traffic Frequency (FOT)) has been investigated between the transmitter station (Baghdad) and numerous receiving stations that laid on different directions over Middle East zone. The values of the ionospheric parameters have been determined using ICEPAC international model for the seasonal and annual times of the current solar cycle (2009-2011). In this work, a mathematical model has been suggested to calculate the ionospheric parameters of the studied area for the tested years of the current solar cycle. According to the statistical analysis results that have been made between the geographical locations coordinates (longitudes & Latitudes) of receiver stations and the dataset of the MUF and FOT parameters, the empirical formula can be presented as a linear surface equation. The predicated ionospheric parameters results that have been evaluated using the suggested mathematical model showed a good fitting with the theoretical results that have been obtained from the HF international communication models.

**KEYWORDS:** Trans-Ionospheric Parameters, HF Radio Propagation, Maximum Usable Frequency, Optimum Traffic Frequency