CONSTRUCTION OF ARIMA MODELS AND THEIR APPLICATION FOR FORECASTING TIME SERIES OF DYNAMICS OF METEOROLOGICAL INDICATORS

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From year to year, the impact of meteorological indicators on the environment becomes more significant and visible, and therefore the research in this area is gaining momentum, and their relevance is increasing [1].

The most important climatic parameters are the air temperature at the ground surface and the concentration of carbon dioxide [2]. In this regard, a number of average daily temperature indicators for the period from 1971 to 2010 in the Central Forest State Nature Reserve of the Tver region and a number of daily measurements of CO2 concentration at different altitudes in Vietnam for the period from 2011 to 2017 were chosen as the objects of study.

In order to analyze the time series, determine its nature, predict and manage the process generating this series, it is necessary to build a model of the series dynamics and interpret the modeling results.

The purpose of the work is to determine by methods of mathematical statistics and mathematical modeling of vibration trends and predict the average daily temperature of the surface layer of the atmosphere in 1971-2010 in the system of the surface layer of the atmosphere - the underlying surface in the southwestern part of the Valdai Hills, as well as research and prediction of a number of concentrations of CO2 in Vietnam at different altitudes in 2011-2017. To solve this problem, a statistical analysis of time series of temperature and CO2 concentration in different regions of the Earth is carried out using statistical forecasting methods.

On the basis of the methods considered in the course of work, the models $ARIMA(0,1,1)(0,0,1)_{12}$ and $ARIMA(1,1,3)(0,1,1)_{12}$ for data on maximum and minimum temperature and $ARIMA(2,1,3)(0,1,1)_{12}$ for CO2 concentration were obtained. The constructed forecasts reflect well the general trend and type of the series, and also agree with the data in the investigated period of time that is confirmed by corresponding criteria of checking of significance and adequacy.

References

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