

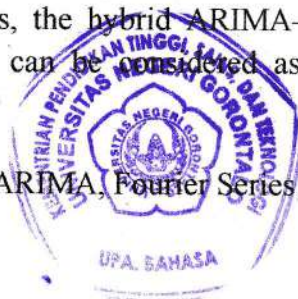
ABSTRACT

SUCI TILOME, 2026. *APPLICATION OF A HYBRID AUTOREGRESSIVE INTEGRATED MOVING AVERAGE AND FOURIER SERIES ANALYSIS MODEL FOR FORECASTING TEN-DAY AIR TEMPERATURE AT THE GORONTALO CLIMATOLOGY STATION.* **UNDERGRADUATE THESIS.** Gorontalo. Study Program of Statistics, Department of Mathematics, Faculty of Mathematics and Natural Sciences, Universitas Negeri Gorontalo.

The Supervisors: **(1) Isran K. Hasan, S.Pd., M.Si. (2) Agusyarif Rezka Nuha, S.Pd., M.Si.**

Air temperature is one of the climate elements that reflects environmental conditions and plays a role in various human activities. Changes in air temperature over time indicate an increasing trend associated with the phenomenon of global warming. This phenomenon also affects climate dynamics, making air temperature patterns more variable. Therefore, air temperature forecasting is necessary to estimate future conditions as a basis for planning and decision-making. To achieve more accurate forecasting, this study employs a method that accounts for time-series characteristics. The study employed a hybrid approach combining Autoregressive Integrated Moving Average (ARIMA) and Fourier Series Analysis (FSA). In this approach, ARIMA is used to model trends and data dependencies, while FSA is applied to capture seasonal components remaining in the residuals of the ARIMA model. The implementation of the hybrid ARIMA–FSA approach produces good forecasting performance. This is indicated by error evaluation values, with a Mean Absolute Error (MAE) of 0.56, Root Mean Square Error (RMSE) of 0.66, and Mean Absolute Percentage Error (MAPE) of 2.07%. These error values indicate that the hybrid ARIMA–FSA approach accurately captures air temperature patterns. Based on the results, the hybrid ARIMA–FSA approach demonstrates consistent performance and can be considered as an alternative method for air temperature forecasting.

Keywords: Air Temperature, Forecasting, ARIMA, Fourier Series Analysis.



LEMBAR PENGESAHAN

Skripsi yang berjudul "**PENERAPAN MODEL GABUNGAN *AUTOREGRESSIVE INTEGRATED MOVING AVERAGE* DAN *FOURIER SERIES ANALYSIS* UNTUK PERAMALAN SUHU UDARA DASARIAN DI STASIUN KLIMATOLOGI GORONTALO**"

Oleh

SUCI TILOME
NIM. 413422014

Program Studi Statistika

Fakultas Matematika dan Ilmu Pengetahuan Alam

Telah dipertahankan di depan pembimbing dan dewan penguji

Hari, tanggal : Senin, 2 Maret 2026

Waktu : 09.00-10.00 WITA

Tempat : Ruang Sidang Statistika

A. Pembimbing

1. **Isran K. Hasan, S.Pd., M.Si**
NIP. 199012112019031009

Pembimbing I

2. **Agusyarif Rezka Nuha, S.Pd., M.Si**
NIP. 199308102019031009

Pembimbing II

B. Dewan Penguji

3. **Prof. Dr. Ismail Djakaria, M.Si**
NIP. 196402261990031003

Penguji I

4. **La Ode Nashar, S.Pd., M.Sc**
NIP. 199107152020121010

Penguji II

Tanda Tangan

(.....)

(.....)

Tanda Tangan

(.....)

(.....)

Mengetahui,

Dekan Fakultas Matematika dan IPA


Prof. Dr. Fitryane Lihawa, M.Si
NIP. 196912091993032001