Forecasting of 25th Solar Cycle

Source code: [25th Solar Cycle Forecasting](https://colab.research.google.com/drive/1CFkp7OaIzDbJrpZHAbLG3hG9xHmtkb-V?usp=sharing)

Data Sources

1. [NOAA Dataset](https://www.ngdc.noaa.gov/stp/space-weather/solar-data/solar-features/solar-flares/index/flare-index/)
2. <https://kp.gfz.de/kpdata?startdate=1932-01-01&enddate=2025-04-15&format=kp1#kpdatadownload-143>
3. <https://www.swpc.noaa.gov/products/solar-cycle-progression>

Related works

1. [Medium blog](https://medium.com/data-science/the-solar-cycle-s-history-data-analysis-and-trend-forecasting-644bf33b7ed7) [github](https://github.com/Nerocraft4/SolarCycleStudySFI/tree/main) -> Time Series(SARIMA model)
2. [Github](https://github.com/1085733665/solar-radio-flux-forecasting/tree/main) -> Transformer-based Solar Radio flux Forecast
3. [Can solar cycles be predicted?](https://arxiv.org/html/2502.00978v1)
4. [Github](https://github.com/cmoestl/heliocats/blob/master/solar_cycle_radio_flux.ipynb) -> Simple solar cycle radio flux
5. [Kaggle](https://www.kaggle.com/code/erevear/solar-geomagnetic-indices-eda) -> Solar & Geomagnetic Indices EDA

Outline

1. Mean sunspot forecasting
2. H-index forecasting
3. Past data forecast till 2020(mine+nasa)
   1. 10.7
   2. Geomagnetic index(ap index)
4. Future solar cycle forecast(sarima model, nasa forecast)
5. Comparison with NASA forecast, my forecast and observed values