

AOSC 652: Analysis Methods in AOSC

Assignment #9a: Fourier Analysis

Due: Wednesday, 26 Oct 2016 (start of class)

Late penalty: This assignment will not be accepted late; please be sure it is in the hands of an instructor prior to the start of class on Wed.

Name: _____

1. (30 points) This assignment involves calculation of a Power Spectrum using a FORTRAN code we will provide, production of a few plots done however you'd like, and the answering of a few questions related to the Power Spectrum. Please turn in a hard copy of whatever plots you use to complete this assignment, as well as responses to the questions below.

For this assignment, no need to turn in any code.

File `~rjs/aosc652/week_09/sunspot_number_monthly.dat` contains Sunspot Number vs Time, from 1749 to present.

Using program `fourier_analysis.f` that was described in class on Monday, find the Power Spectrum of this time series for time periods from **7** to **15** years every 0.1 years and:

a) (10 points) produce a plot that starts at 7 years, that ends at 15 years, and illustrates the Power Spectrum of the Sunspot Number time series.

b) (5 points) what is the period of the Sunspot Number time series, in units of time?

c) (5 points) what is the period of the Sunspot Number time series, in units of frequency?

d) (10 points) does your answer to b) and c) “make sense”, given the nature of the Sunspot Time series?

Provide an additional plot (annotated either by hand or perhaps in Power Point) to support your answer, and for your answer, please provide in paragraph form rather than as a single word or short phrase.