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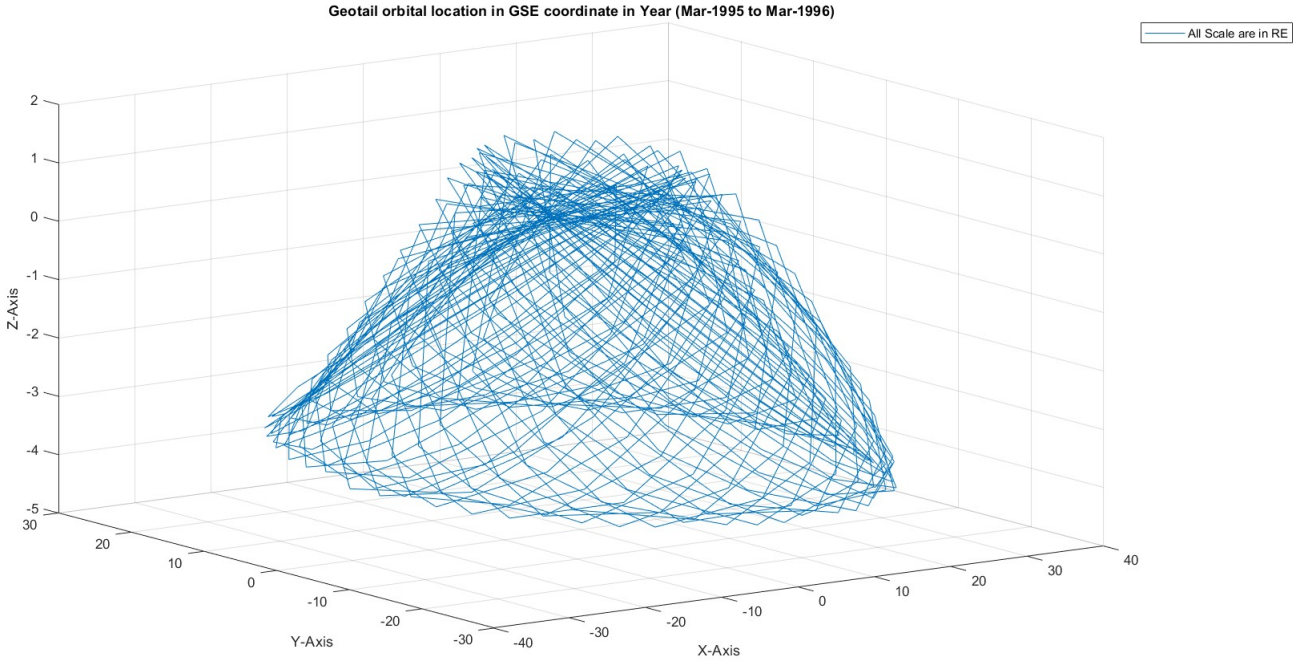
Assignment 2
AA603 Space Engineering System

2022-08-19

1 GEOTAIL

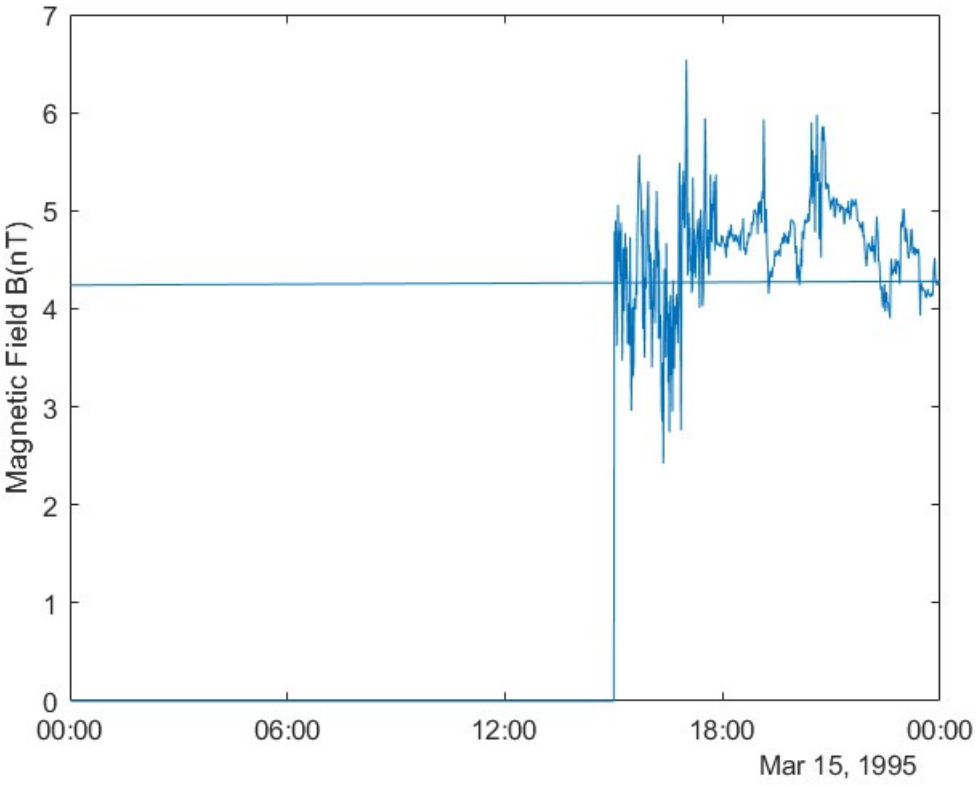
- The GEOTAIL mission is a collaborative project undertaken by the Institute of Space and Astronautical Science (ISAS), Japan Aerospace Exploration Agency (JAXA), and the National Aeronautics and Space Administration (NASA).
- The GEOTAIL magnetosphere tail observation satellite launched by a Delta-II rocket from Cape Canaveral, Florida in the US on the 24th of July, 1992 is part of a cooperative project between the US and Japan.
- It's orbit altitude is Perigee 57,000 km, Apogee 200,000 km, orbit inclination 29°, orbit type is Double lunar swing-by.
- Geotail main objective is Research on structure and dynamics of the earth's magnetotail
- It has the following instrument for its scientific experiment
    1. Magnetic Fields Measurement Monitor (MGF)
    2. Low Energy Particles Experiment (LEP)
    3. Electric field monitor (EFD)
    4. Energetic Particles and Ion Composition Experiment (EPIC)
    5. High-Energy Particle Monitors (HEP)
    6. Plasma Wave Instrument (PWI)
    7. Comprehensive Plasma Instrument (CPI)

Geotail orbital location in GSE coordinate



Orbital Parameter found from the graph
The Apogee Distance in Re for Geotail is 30.664496
The Perigee Distance in Re for Geotail is 9.876305
The Semi Major Axis of the orbit in Re is 20.270400
The Eccentricity of the orbit is 0.512772

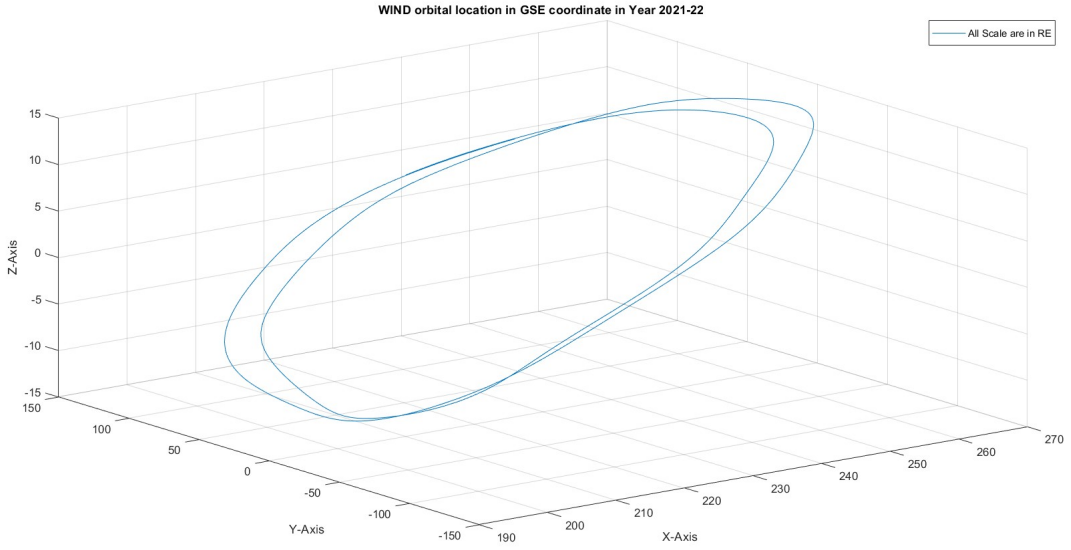
Magnetic field values plot from 1995-03-15 to 1995-03-15 every 1-Minutes



2 WIND

- The Global Geospace Science (GGS) Wind satellite is a NASA science spacecraft.
- It was launched on 1 November 1994, at 09:31:00 UTC, from launch pad LC-17B at Cape Canaveral Air Force Station (CCAFS) in Merritt Island, Florida, aboard a McDonnell Douglas Delta II 7925-10 rocket.
- WIND was initially placed in a double-lunar-swingby orbit near the ecliptic plane with an apogee from 512000 to 1600000 Km and a perigee of 32000 to 64000 km during first two years , it has a inclination = 19.6º. In this orbit, lunar gravity assists were used to keep the apogee over the day hemisphere of the Earth, and magnetospheric observations were made.
- The primary science objectives of the Wind mission are: Provide complete plasma, energetic particle and magnetic field for magnetospheric and ionospheric studies,Investigate basic plasma processes occurring in the near-Earth solar wind,Provide baseline, 1 AU, ecliptic plane observations for inner and outer heliospheric missions.
- It has the following instrument for its scientific experiment
    1. Radio and Plasma Wave Experiment (WAVES)
    2. Energetic Particle Acceleration, Composition, and Transport Experiment (EPACT)
    3. Solar Wind and Suprathermal Ion Composition Experiment (SMS)
    4. Solar Wind Experiment (SWE)
    5. Two Triaxial Fluxgate Magnetometers (MFI magnetic field investigation)
    6. Three-Dimensional Plasma and Energetic Particle Investigation (3DP)
    7. Transient Gamma Ray Spectrometer (TGRS)
    8. Konus Gamma Ray Burst Studies Experiment.

WIND orbital location in GSE coordinate



Orbital Parameter found from the graph
The Apogee Distance in Re for Wind is 105.832094
The Perigee Distance in Re for Wind is 15.304476
The Semi Major Axis of the orbit in Re is 60.568285
The Eccentricity of the orbit is 0.747319

Magnetic field values plot from 2022-01-01 to 2022-01-05 every 1-Minutes