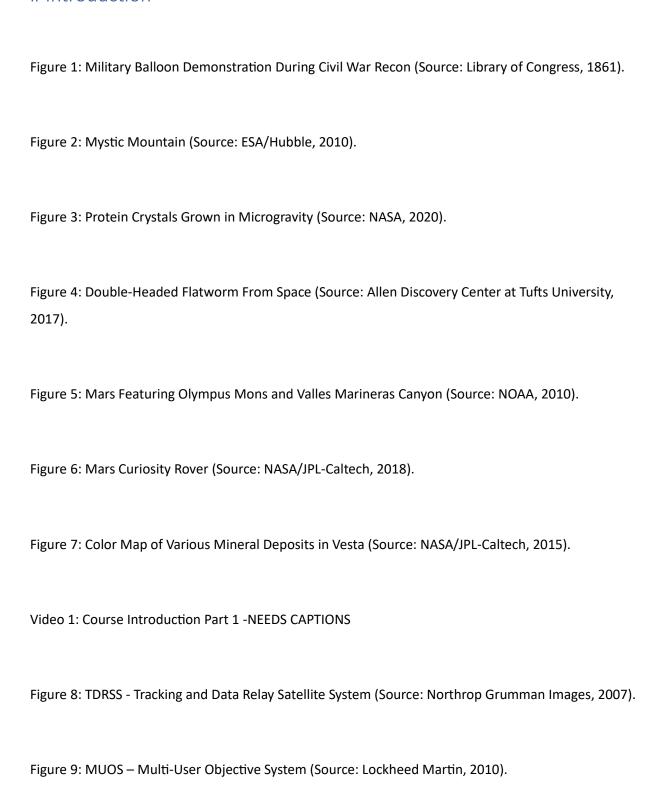
Introduction



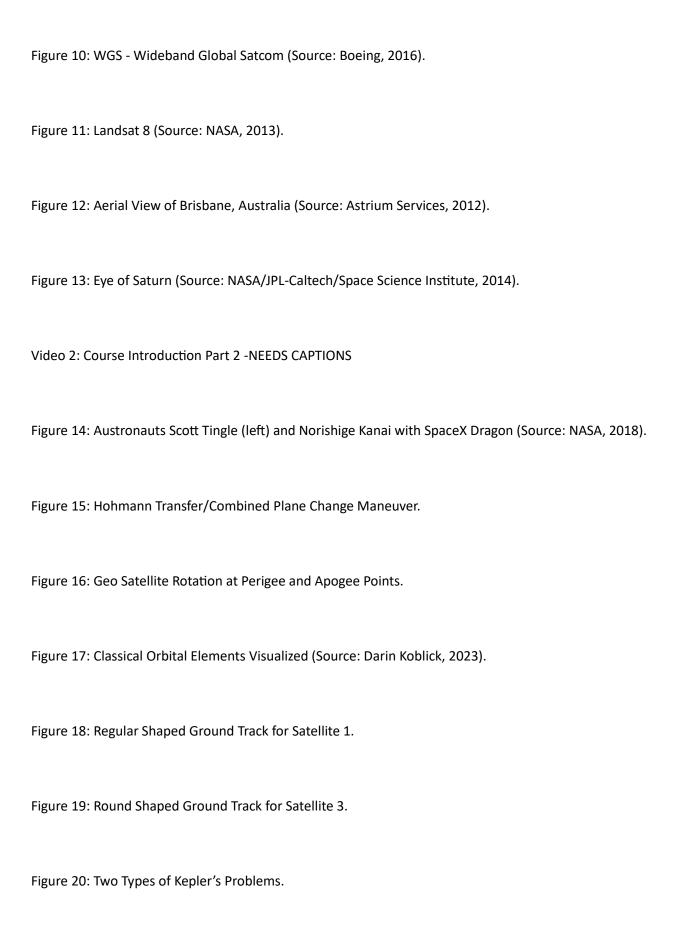


Figure 21: Two-Impulse Hohmann Orbital Transfer Maneuver (Source: McZusatz, 2011). Figure 22: Orbit Plane Changes (Source: Blog Spot, 2013). Figure 23: Dragon Rendezvous With ISS (Source: NASA, 2012). Figure 24: Russian MIR Space Station (Source: NASA/Crew of STS-91, 1998). Video 3: Course Introduction Part 3 - NEED CAPTIONS # CHAPTER 1 Video 1: Math Review. -NO CAPTIONS Figure 1: Bust of Aristotle (Source: New York Times, 2016). Figure 2: The Geocentric Theory of the Universe (Source: Scott Powell, 2014).

Figure 3: Bust of Copernicus (Source: Faces of History, 2023).

Figure 4: The Heliocentric Theory of the Universe (Source: Scott Powell, 2014).

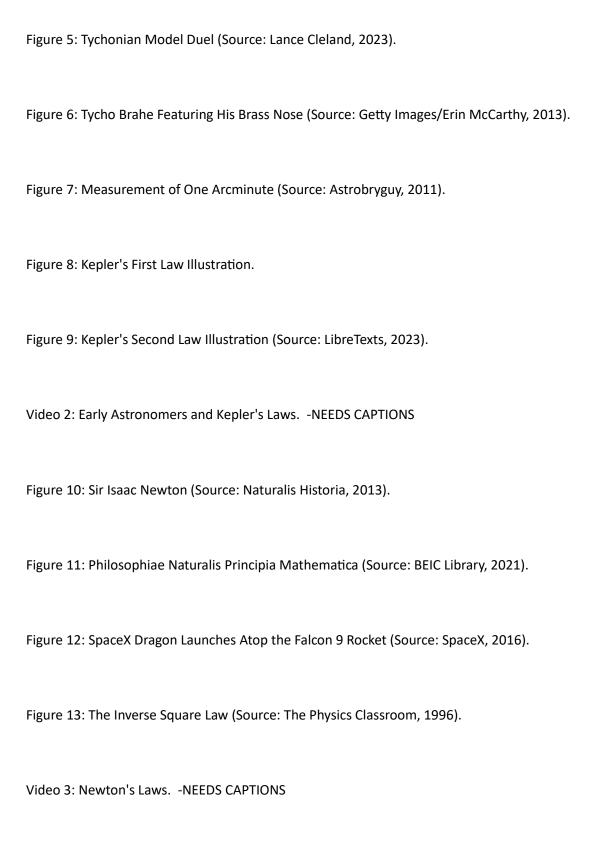




Figure 23: Associated Geometry for the Two-Body Equation of Motion With Emphasis on Angle Beta (Source: Siegenthaler and Saylor, 2017).

CHAPTER 2

Figure 1: Newton's Cannon Simulator (Source: Fowler and Dolgert, 2023).

Figure 2: Types of Orbits Seen in Newton's Canon Simulation.

Figure 3: A Rocket's Horizontal Gravity Turn (Source: Arjit Raj, 2017).

Figure 5: Earth's Orbit Around the Sun (Source: Encyclopædia Britannica Inc., 2015).

Figure 6: Molniya Satellite Orbit Around the Earth (Source: GIFER, 2021).

Figure 7: A Schematic of an Orbit (Source: NASA, 2000).

Figure 8: GPS Satellite Constellation (Source: ESA, 2011).

Figure 9: ISS Orbit Visualized on the Flat Earth Map (Source: Janosh Gaia, 2019).

Figure 10: Parabolic Orbit Visualization (Source: Brandir, 2006).

Figure 11: Comet C/2006 P1 McNaught (Source: fir0002, 2007).

Figure 12: Hyperbolic Orbit Visualization (Source: Brandir, 2006).

Figure 13: Hyperbolic Orbit Eccentricities (Source: American Math Society, 2005).

Figure 14: Hyperbolic Departure Visualized.

Figure 15: Comet Swift-Tuttle Snapshot (Source: Takoda Edlund, 2007).

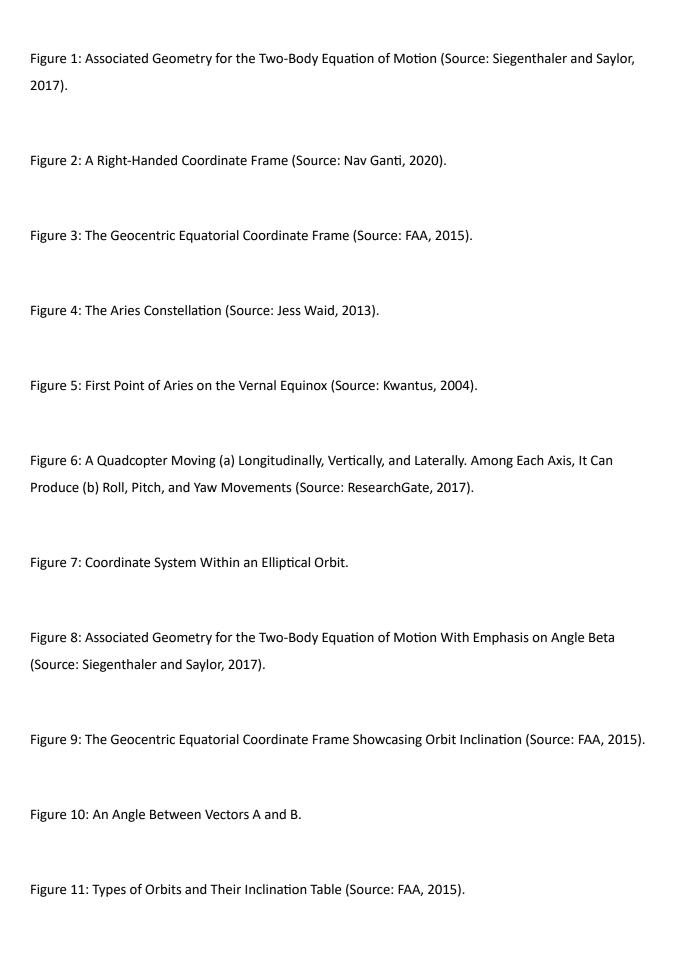
Figure 16: Perseid Meteor Shower Snapshot (Source: University of Nottingham, 2016).

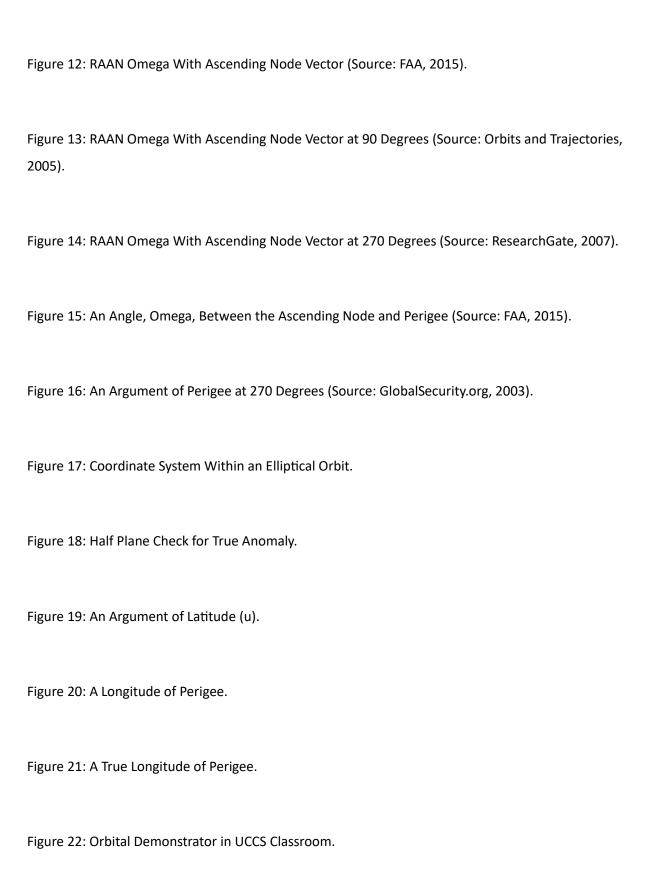
Figure 17: New Horizons Spacecraft Begins First Stages of Pluto Encounter (Source: NASA, 2015).

Figure 18: New Horizons Spacecraft Encounter With 2014 MU69, aka Ultima Thule (Source: NASA/JHUAPL/SwRI).

Figure 19: New Horizons Spacecraft Path Through the Cosmos (Source: NASA/New Horizon, 2015).

CHAPTER 3





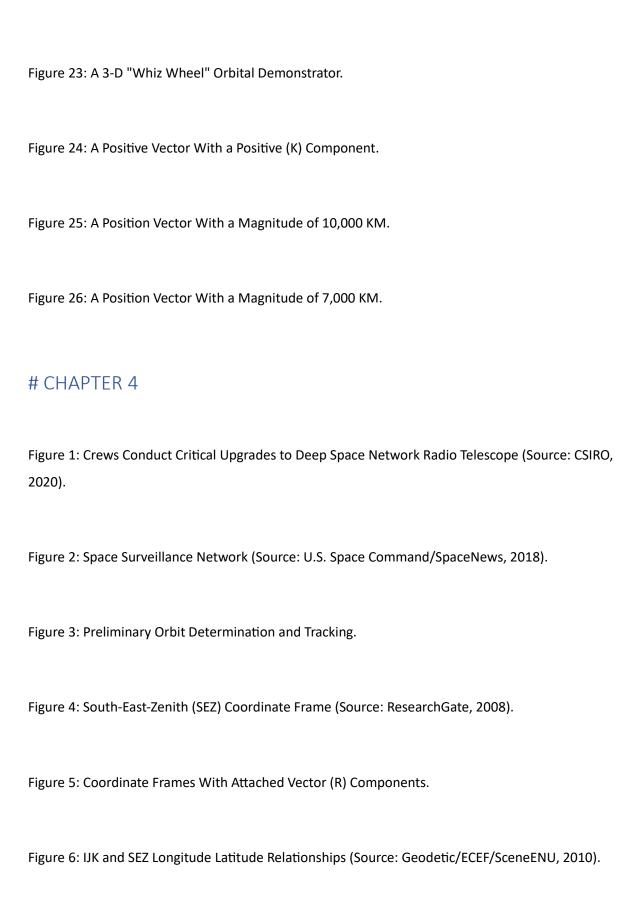
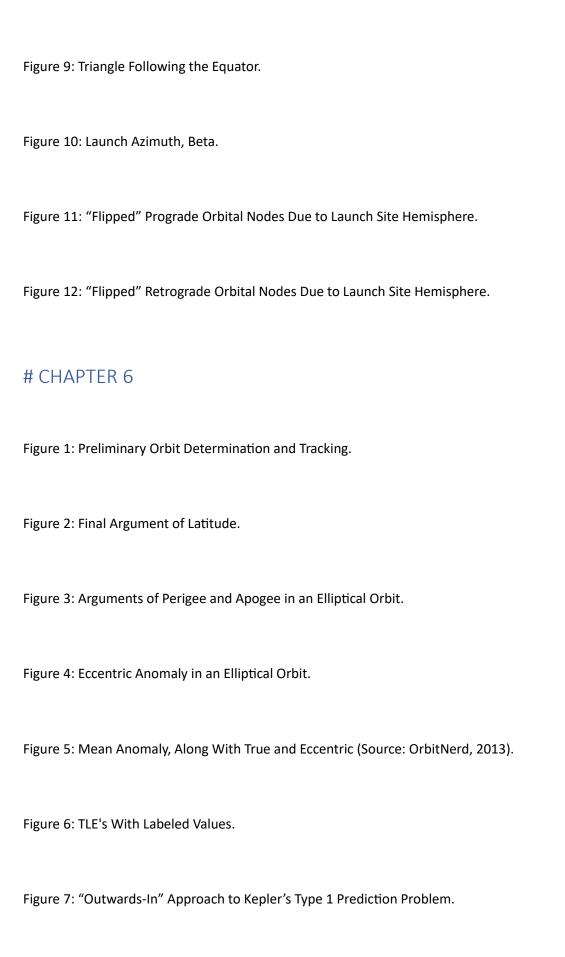
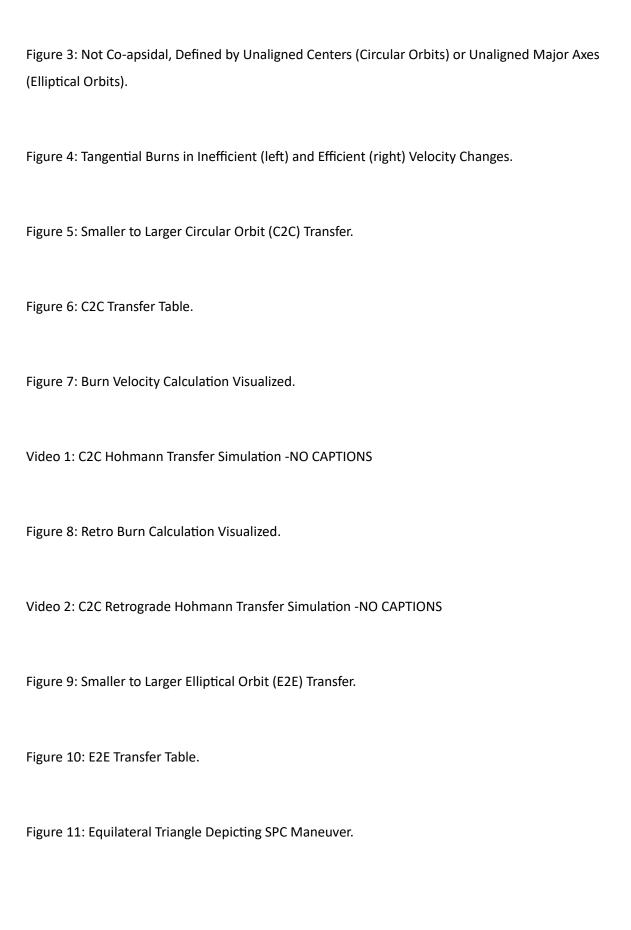


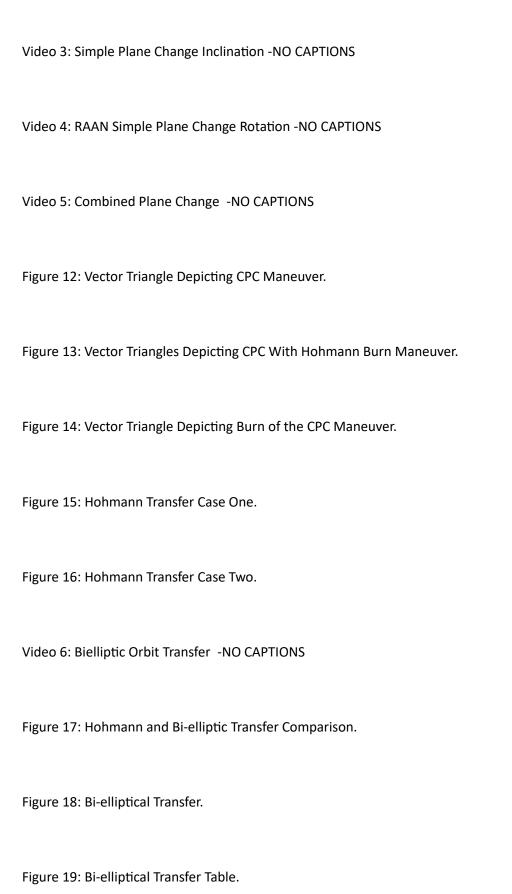


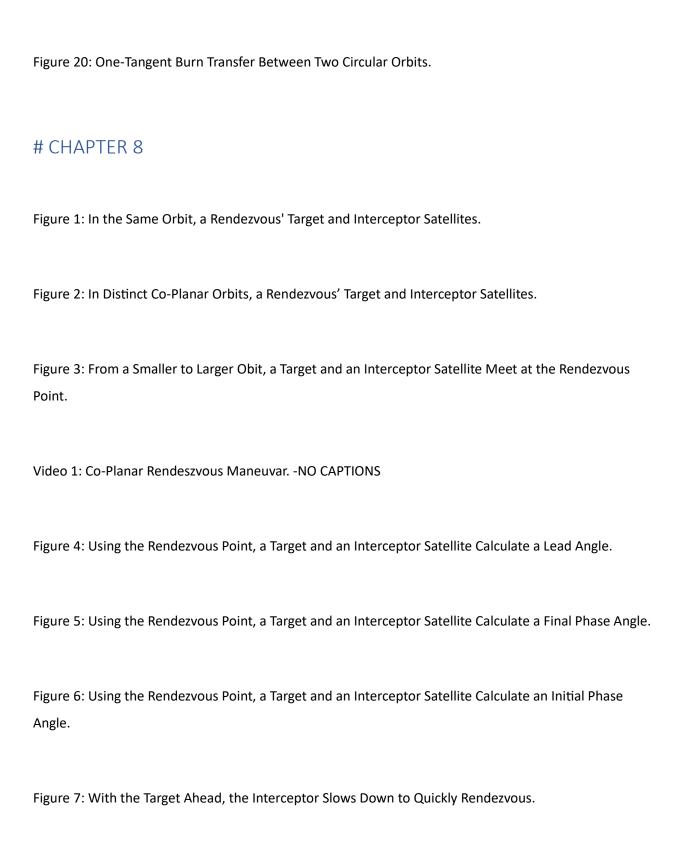
Figure 18: A Satellite's Orbit With Two Known Position Vectors and Their Time of Flight. Figure 19: Position Vectors With TOF to Orbital Elements. # CHAPTER 5 Figure 1: A Sundial With Its Gnomon Marked in Red (Source: Envato Elements, 2023). Figure 2: Standard Time Zones of the World (Source: CIA, 2015). Figure 3: Inertial Reference Point Demonstrates Sidereal Time. Figure 4: Map Illustrating Differences Between LST and GST (Source: NASA, 2016). Figure 5: Diagram Illustrating Differences Between a Solar and Sidereal Day. Figure 6: Near Ascending Node. Figure 7: Near Descending Node. Figure 8: The Spherical Law of Cosines (Source: Herve1729, 2008).











Video 2: Target Ahead of Interceptor. -NO CAPTIONS

Figure 8: With the Interceptor Behind, the Target Uses Its Travel Angle to Quickly Rendezvous.

Figure 9: Both Satellites Calculating Their Change in Velocity to Quickly Rendezvous.

Figure 10: With the Target Behind, the Interceptor Speeds Up to Eventually Rendezvous.

Video 3: Target Behind of Interceptor. -NO CAPTIONS

Figure 11: With the Interceptor Ahead, the Target Uses Its Travel Angle to Eventually Rendezvous.

Figure 12: Both Satellites Calculating Their Change in Velocity to Eventually Rendezvous.

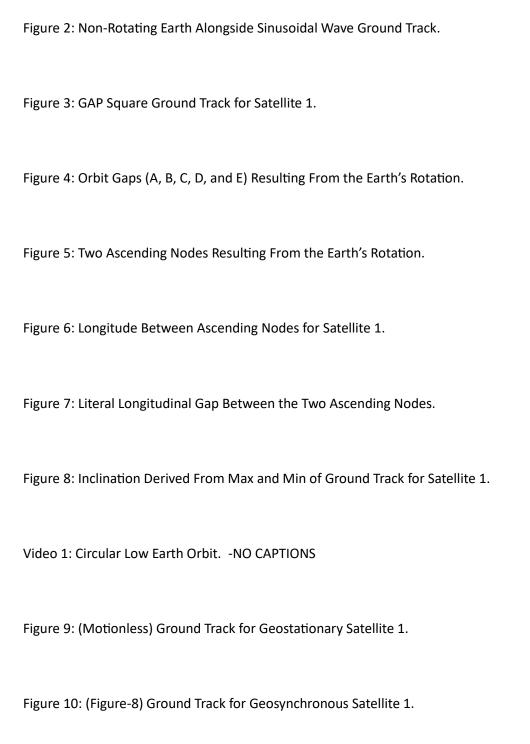
Figure 13: A Target and Payload (Interceptor) Satellite Co-Orbiting the Earth.

Video 4: Slow Down to Speed Up. -NO CAPTIONS

Video 5: Speed Up to Slow Down. -NO CAPTIONS

CHAPTER 9

Figure 1: Simple Shaped Ground Track for Satellite 1.



Video 2: Circular 24 Hour Orbit. -NO CAPTIONS

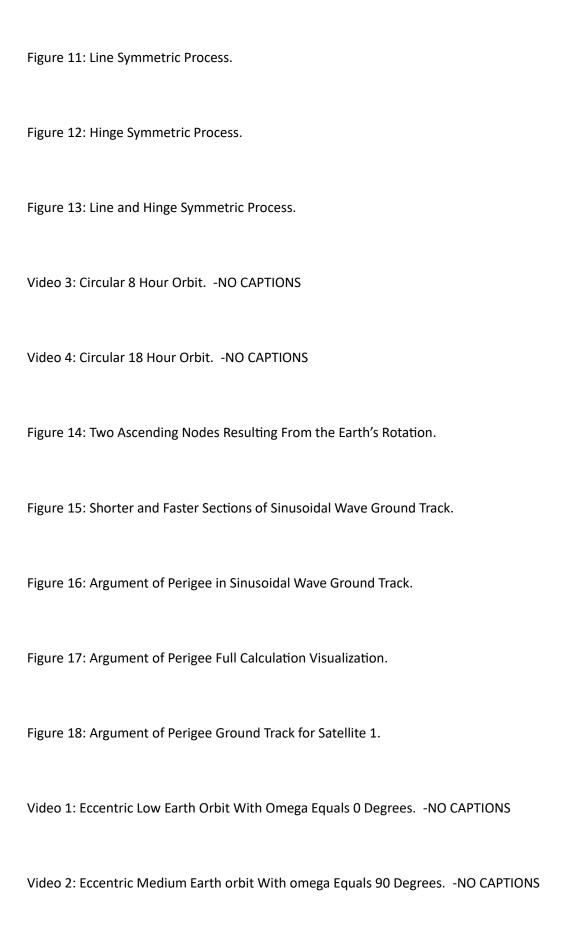


Figure 19: Backwards Section of Ground Track for Satellite 1.

Figure 20: Argument of Perigee in a Retrograde Ground Track for Satellite 1.

Video 3: Eccentric Giant Earth Orbit With Omega Equals 180 Degrees. -NO CAPTIONS

Video 4: Eccentric Giant Earth Orbit With Omega Equals 270 Degrees. -NO CAPTIONS

Figure 21: (90 Degrees) Argument of Perigee Ground Track.

Figure 22: (270 Degrees) Argument of Perigee Ground Track.

Video 5: Eccentric Low Earth Orbit. -NO CAPTIONS

Video 6: Eccentric Medium Earth Orbit. -NO CAPTIONS

Video 7: Circular 8 Hour Orbit. -NO CAPTIONS

Figure 23: Solved Ground Track for Satellite 1.

Video 8: Circular 18 Hour Orbit. -NO CAPTIONS

