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BARCELONATECH

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SIMULACIÓ DE SISTEMES INDUSTRIALS I LOGÍSTICS

GABBARD DIAGRAMS

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Table of Contents

List of figures	3
1. Descriptions of experiment	4
1.1. Gabbard Diagram.....	4
1.2. Result	5
Conclusion	6

List of figures

FIG. 1.0. GABBARD PLOT OF COSMOS 1408 DEBRIS	5
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1. Descriptions of experiment

1.1. Gabbard Diagram

In this practical you have to read the TLEs contained in the file Cosmos1408.txt and create a Gabbard diagram. In the xx axis you should put the orbital period, and in the yy axis the apogee and the perigee (see examples in the course slides).

You can use the Matlab m-file “readtle.m” to obtain the data from the different fragments. If you prefer to use other programming language that is fine with me. In all cases, please provide comments to what you are doing in the code.

The period is obtained as $PP = 2\pi\sqrt{aa^3/\mu}$

where aa is the semi-major axis (obtained from the TLE file), and $\mu = 3.986004 \times 10^{14} \text{ m}^3/\text{s}^2$ is the Earth's gravitational parameter.

The apogee and perigee are calculated as $rr_{pp} = aa(1 - ee)$ $rr_{aa} = aa(1 + ee)$

being ee the orbital eccentricity (again, obtained from the Cosmos1408.txt file).

1.2. Result

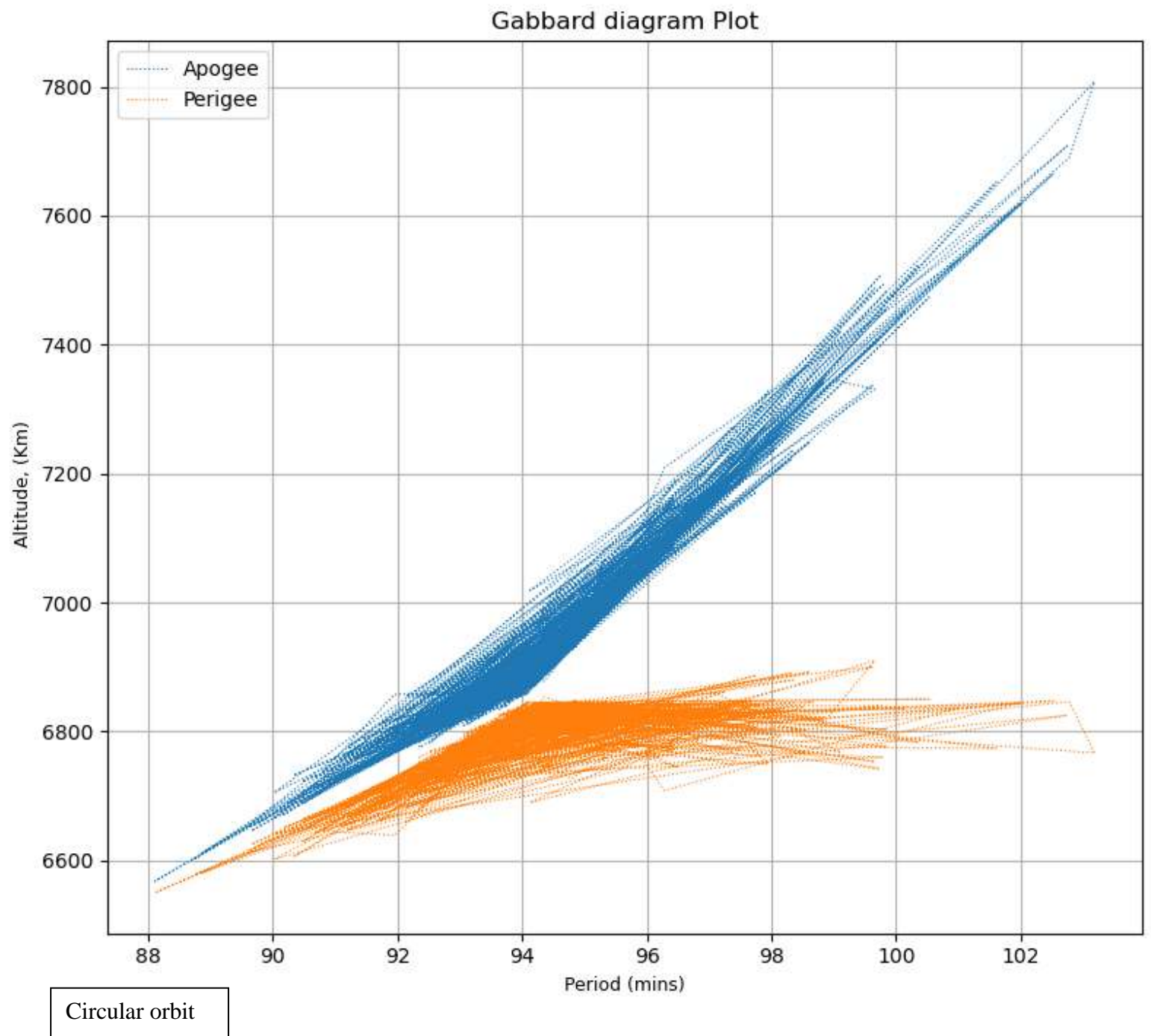


Fig. 1.0. Gabbard plot of COSMOS 1408 debris

Conclusion

Python code was use to compute the Gabbard plot of COSMOS 1408 debris. The plot shows the debris are in circular orbit.

The python code is attached in atena.