A Classification Model of Exoplanets using Microsoft Excel

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Characteristics of exoplanets were studied to comprehend what kind of planetary system in the universe our solar system is.

1. Study method

339 exoplanets were selected whose radius, mass, and semi-major axis of the orbital ellipse were calculated, and also whose central star's spectral type, temperature, apparent magnitude, and distance from the Earth were known. They were compared separately on the spectral type of central stars, and their features were shown graphically using Microsoft Excel.

In order to determine a type of planet (terrestrial planet, ice planet, or gas giant), we used a theoretical curve of Radius–Mass graph proposed by Seager *et al.* (2007). The semi-major axis was compared with the inner limit of the Habitable Zone and with the so-called Snow Line.

2. Result and Discussion

Except in the case of M-type stars, there are a lot of low-density planets close to their central stars. They are assumed to be as gas giants. On the other hand, the relatively high-density planets determined to be terrestrial planets are not few in the case of M-type stars. No evident ice planet may be included in samples of this study.

Such result may suggest that large planets near the central star are detected more easily with any observation method. However, the low-density planets close to the central stars are also numerous in the G-type star systems, so it is thought that our solar system was formed maintaining equilibrium among the same spectral type.

Keywords: Exoplanets