Answer on Question #45505, Physics, Mechanics | Kinematics | Dynamics

Question:

The earth rotates ONCE in about 24 hour. Calculate its rotation frequency and its angular frequency.

Answer:

Rotational frequency (f) gives the number of rotations that an object undergoes in a specified unit of time. The period (T) is the time it takes the object to make one full rotation. Therefore:

$$f = \frac{1}{T} = \frac{1}{24 \cdot 60 \cdot 60 \; s} = 1.16 \cdot 10^{-5} \; Hz$$

One revolution is equal to 2π radians, hence

$$\omega = \frac{2\pi}{T}$$

where ω is angular frequency, T is time of 1 rotation.

$$\omega = \frac{2\pi}{T} = \frac{2 \cdot 3.14}{24 \cdot 60 \cdot 60} = 7.27 \frac{rad}{s}$$