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Interior of Mars and its orientation in space

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Nutations of a planet are periodic motions of the rotation axis of this planet in space. These motions are induced by the gravitational attractions of the Sun and the eventual moon(s) in revolution around the planet. They can be computed from the ephemerides of the relative positions of the celestial bodies. The response of the planet to this forcing depends also on the internal structure of the planet. This can be accounted for using a so-called transfer function integrating the physics of the planet's interior. This transfer function accounts for rotational normal modes of the Earth such as the Free Core Nutation if the core is flattened and liquid, and the Free Inner Core Nutation if there is an inner core inside the liquid core. The observation of nutation brings information on the planetary deep interior. We evaluate these effects on the Mars' orientation and examine the possibilities of future mission such as the ExoMars and Mars-NEXT missions as Mars' orientation changes can be observed by using radioscience.