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AUTHOR: (8) Saakyan, R.A.

TITLE: (6) Additional acceleration in the motion of celestial bodies

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TEXT: It is pointed out that when the centre of mass of a system of two bodies executes a curvilinear motion an additional acceleration appears in the equation for the relative motion of the two bodies. This additional acceleration is given by:

$$S = 2\left[\bar{U}_r\bar{\omega}\right] + \left[\bar{\omega}\left[\bar{a}\ \bar{\omega}\right]\right] + \left[\bar{a}\ \frac{d\bar{\omega}}{dt}\right] \qquad (8)$$

where $\bar{\omega}$ is the angular velocity of the centre of gravity, $\bar{U}_r/dt$ is the velocity of relative motion in the centre-of-mass system, $\bar{a}$ is the distance between the two bodies and the square brackets represent vector products. This additional acceleration is said to be a real effect, independent of the choice of the coordinate system. It gives rise to a force

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which must be added to the gravitational attraction in order to obtain a correct equation for the relative motion of the two bodies. It immediately follows that the fact that the Sun moves around the centre of the galaxy, and the centre of the galaxy itself may also be in a curvilinear motion, must be taken into account in studying the motion of planets relative to the Sun and the motion of satellites relative to planets. In fact, this is a general conclusion for all binary systems. In particular, the relative motion of the Moon-Earth system, which was solved by Laplace and Hill, is subject to this correction, but the latter has not so far been taken into account. There are 2 tables.

ASSOCIATION: Byurakanskaya astrofizicheskaya observatoriya Akademii nauk ArmSSR (Byurakan Astrophysical Observatory, AS ArmSSR)

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