LETTERS TO THE EDITOR

A FUNDAMENTAL RESULT FOR ROTATING RECTANGULAR CARTESIAN FRAMES

IN the following is reported a result for a rectangular cartesian frame rotating uniformly with respect to another having the same origin. Although it is simple and interesting it is far from obvious and does not seem to have attracted any attention so far.

Let O-xyz be a frame with respect to which $\dot{x},\dot{y},\dot{z}$ are the velocities and $\ddot{x},\ddot{y},\ddot{z}$, the accelerations of a particle at time t. Let O-XYZ be another frame with respect to which $\dot{X},\dot{Y},\dot{Z}$, $\ddot{X},\ddot{Y},\ddot{Z}$ can be similarly defined. At the instant when the three pairs of axes Ox, OX, Oy, OY and Oz, OZ coincide let one set rotate about the other with constant angular velocity (p, q, r). It can then be verified that

$$(\ddot{x}-\ddot{X})(\dot{x}+\dot{X})+(\ddot{y}-\ddot{Y})(\dot{y}+\dot{Y})+(\ddot{z}-\ddot{Z})(\dot{z}+\dot{Z})=0$$

This implies that *the vector representing the relative acceleration is perpendicular to the vector representing the mean of the velocities.* The verification is made immediate when, for example, one puts

$$X = \dot{x} + qz - ry,$$

$$\ddot{X}=\ddot{x}+2q\dot{z}-2r\dot{y}+pqy+prz-x(q^2+r^2)$$

etc.

The above property came to my notice while Prof. V. V. Narlikar and I were investigating a relativistic problem of rotation.

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ULTRA-VIOLET BANDS OF THE MERCURY IODIDE MOLECULE

THE two band systems of the mercury iodide molecule in the region λ 2240-λ 2100, reported by Prilheshejewa[1] and designated by us as the G and H systems,[2] have been newly measured. They consist of about 50 and 25 band heads, definitely degraded to the red. A complete vibrational analysis of the two systems has given the following constants:

	G system	H system
ν_e =	45542·4	47110·2
ω'_e =	88·0	97·1
$\chi'_e\omega'_e$ =	0·2	1·65
ω_e'' =	125·7	125·3
$\chi_e''\omega_e''$ =	1·2	1·15

The two systems have a common final level which is known to be the ground state of the molecule. The H system presents an interesting case of predissociation similar to that observed in the β system of NO or the Fourth Positive system of N_2. It consists of just just three v'' progressions of bands with v' = 0, 1 and 2, and the bands show an abrupt termination, those with higher values of v' being absent altogether.

A full report of the work will be published shortly.

Andhra University, K. R. RAO.
Waltair, C. RAMA SASTRY.
January 9, 1947.

1. Prilhesh-jewa, *Phys. Z. Soviet.* 1939, **1**, 109.
2. Rao, K. R. and others, *Ind. Jour. Phys.*, 1944 **18**, 323.