−Coliolis force in view from localized inertia coordinate system−. ’11/1/22, 7/30

This is entirely error version, but shall be left as a wrong sample.

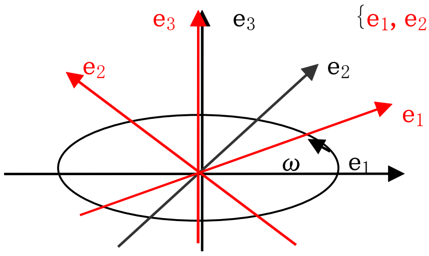
[1]:Rotational coordinate and deriving ″Coliolis Force″.

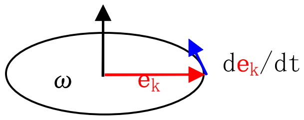
(1)coordinates: $\{e_1, e_2, e_3\}$ is inertia fixed coordinate(IC).

$\{e_1, e_2, e_3\}$ is non-inertia rotational coordinate(NC)

with **angular velocity vector** $\equiv \omega$.

Then note that $de_k/dt = \omega \times e_k$.





(2)position vector: $R = \Sigma_{k=1}{}^{3} R_k e_k$.

(3)velocity vector:

$V = dR/dt = \Sigma_{k=1}{}^{3}(dR_k/dt)e_k + \Sigma_{k=1}{}^{3}R_k(de_k/dt) = \Sigma_{k=1}{}^{3}(dR_k/dt)e_k + \Sigma_{k=1}{}^{3}R_k(\omega \times e_k)$

$= \Sigma_{k=1}{}^{3}V_k e_k + (\omega \times R) = V + (\omega \times R)$.

(4)accelation vector:

$f \equiv dV/dt = \Sigma_{k=1}{}^{3}(dV_k/dt)e_k + \Sigma_{k=1}{}^{3}V_k(de_k/dt) + (d\omega/dt \times R + \omega \times dR/dt)$

$= \Sigma_{k=1}{}^{3}(dV_k/dt)e_k + (\omega \times V) + d\omega/dt \times R + \omega \times \langle V + (\omega \times R)\rangle$

$= dV/dt + 2(\omega \times V) + \omega \times (\omega \times R) + d\omega/dt \times R$ ″in climate science, $d\omega/dt = 0$″.

$f \equiv dV/dt = dV/dt + 2(\omega \times V) + \omega \times (\omega \times R)$.

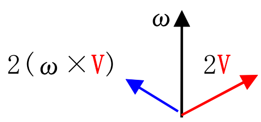
(5)$f \equiv dV/dtf \equiv 0$, free motion in IC and Coliolis force in NC.

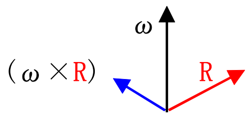
$f \equiv dV/dtf \equiv 0. \rightarrow 0 = dV/dt + 2(\omega \times V) + \omega \times (\omega \times R). \rightarrow dV/dt = -2(\omega \times V) - \omega \times (\omega \times R)$.

[2]:Forcing rotational coordinate as localized? ″inertia one″ by $(+\omega \rightarrow -\omega)$.

Now we must make rotational coordinate(NC) as innertia one by reverse-rotating original fixed coordinate(IC) with angular coordinate $\omega \equiv -\omega$. Then we derive

(1) $dV/dt = 2(\omega \times V) - \omega \times (\omega \times R)$.



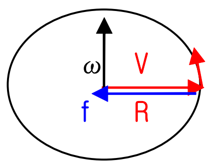


(2)becoming reasonable circular motion(**centrifugal force**):

$V \equiv 0$, $V \equiv \omega \times R$.

$dV/dt = 2(\omega \times V) - \omega \times (\omega \times R) = \omega \times V = \omega \times (\omega \times R) = f/m$.

The force f must be oriented toward rotational center axis.



(3)If we took the former formulation as $dV/dt = -2(\omega \times V) - \omega \times (\omega \times R)$,

then the circular motion encouter an evident fatal contradiction !.

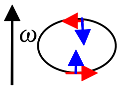
$dV/dt = -3\omega \times V = -3\omega \times (\omega \times R)$. <<it can not be **centrifugal force** !!!>>

(4)Author himself noticed the error force direction in Coliolis one in
a lecture on climate science and then in my texts on clasical mechanics.

(a)the former one(error).

$f_C = -2(\omega \times V)$。

(b)counter clockwise in typhoon eddy direction in the northern hemisphere.

$f_C = +2(\omega \times V)$。 

<<couter clockwise eddy in NH>>

(c)Rotational axis can not be mathematically regular at $R = \infty$。
Pseudo rotating this universe seems more non-regular, though it might be regular in localized time and space.

Discussion:

In the special theory of relativity, physical basic equation must be invariant by Lorentz transform between "inertia coordinates of uniform motion". At least, a coordinate representing physical low must be **localized inertia one**[1]. Because accelated coordinate such as rotational one is not inertia one, so it seem not absurd that globaly accelated coordinate system would encounter some contradiction or difficulty.

Reference:

(1)R. Utiyam, Invariant theoretical interpretation of interaction,
Phys. Rev **101**(1956)1957.

*The gravitational field theory derived from localized Lorentz invariant principle could conclude the unified field theory(electromagnetic, weak, strong, and gravitational field in elementary particle theory) of SO(11, 1)[2] in 1995<completion of the theory>.

(2)Authors website.

http://www.777true.net/GRAVITY_FIELD_as_GUAGE_one.pdf

http://www.777true.net/QFTstructure1.pdf

Supplement:On localized(infinitesimal)inertia coordinate system(2011/1/23).

Any translation accelating infinistesimal time and space system of $[ct, x_1, x_2, x_3] \sim [c(t+dt), x_1+dx_1, x_2+dx_2, x_3+dx_3]$ could be considerd inertia one. Then rotation is also neglegivle because of zero rotation radius. The essence is linearlization.