TOSHKENT IRRIGATSIYA VA QISHLOQ XO'JALIGINI MEXANIZATSIYALASH MUHANDISLARI INSTITUTI

FAN: NAZARIY MEXANIKA

MAVZU 15

. DALAMBER PRINSIPI. QO'ZG'ALMAS O'Q ATROFIDA AYLANUVCHI JISMNING TAYANCHLARGA KO'RSATADIGAN BOSIMINI ANIQLASH

Husanov Q.

Nazariy va qurilish mexanikasi kafedrasi dotsenti

TAQDIMOT REJASI

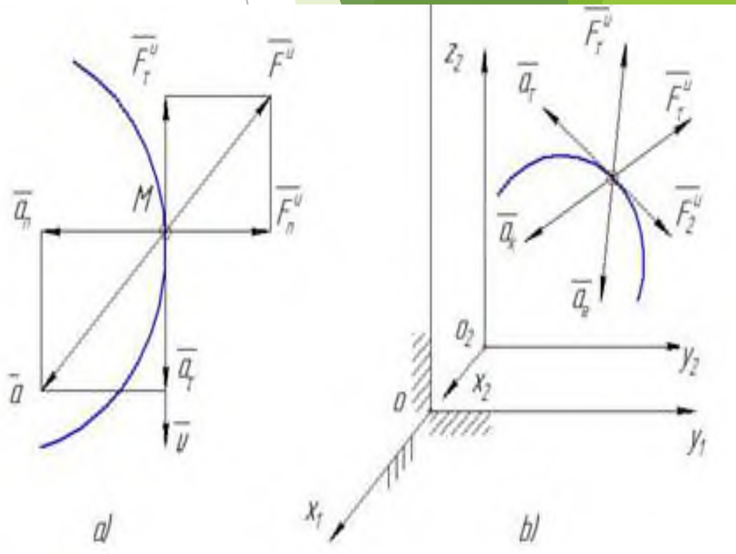
5.Moddiy nuqta uchun Dalamber prinsip

6. Moddiy nuqtalar sistemasi uchun Dalamber prinsipi

Moddiy nuqta uchun Dalamber prinsipi

$$m\vec{a}=\vec{F}+\vec{R} \Rightarrow \vec{F}^{u}=-m\vec{a} \Rightarrow \vec{F}+\vec{R}+\vec{F}^{u}=0 \Rightarrow \{\vec{F},\vec{R},\vec{F}^{u}\}\infty 0$$

$$F_x+R_x+F_x^u=0,\quad F_y+R_y+F_y^u=0,\quad F_z+R_z+F_z^u=0$$



a) agar nuqta biror egri chiziqli trayektoriya bo'ylab harakatlansa:

$$\vec{F}^{u}=\vec{F}_{\tau}^{u}+\vec{F}_{n}^{u} \Rightarrow \vec{F}_{\tau}^{u}=-m\vec{a}_{\tau},\quad \vec{F}_{n}^{u}=-m\vec{a}_{n}$$

$$\vec{F}^{u}=\vec{F}_{r}^{u}+\vec{F}_{e}^{u}+\vec{F}_{k}^{u} \Rightarrow \vec{F}_{r}^{u}=-m\vec{a}_{r},\quad \vec{F}_{e}^{u}=-m\vec{a}_{e},\quad \vec{F}_{k}^{u}=-m\vec{a}_{k}=-2m(\vec{\omega}\cdot\vec{\vartheta}_{r})$$

b) agar nuqta murakkab harakatda ishtirok etsa:

Moddiy nuqtalar sistemasi uchun Dalamber prinsipi

$$\vec{F}_u + \vec{R}_k + \vec{F}_k^u = 0 \qquad \vec{F}_k^u = -m_k \vec{a}_k \qquad \{\vec{F}_k, \vec{R}_k, \vec{F}_k^u\} \infty 0$$

$$\sum_{k=1}^{N} \vec{F}_k + \sum_{k=1}^{N} \vec{R}_k + \sum_{k=1}^{N} \vec{F}_k^u = 0 \qquad \sum_{k=1}^{N} (\vec{r}_k \times \vec{F}_k) + \sum_{k=1}^{N} (\vec{r} \times \vec{R}_k) + \sum_{k=1}^{N} (\vec{r} \times \vec{F}_k^u) = 0$$

$$\Rightarrow \sum_{k=1}^{N} \vec{m}_0(\vec{F}_k) + \sum_{k=1}^{N} \vec{m}_0(\vec{R}_k) + \sum_{k=1}^{N} \vec{m}_0(\vec{F}_k^u) = 0$$

$$\Rightarrow \sum_{k=1}^{N} \vec{F}_k^e + \sum_{k=1}^{N} \vec{F}_k^u = 0$$

$$\sum_{k=1}^{N} \vec{m}_0(\vec{F}_k) + \sum_{k=1}^{N} \vec{m}_o(\vec{F}_k^u) = 0$$

Qo'zg'almas o'q atrofida aylanuvchi jismning tayanchlariga ko'rsatadigan bosimini aniqlash

$$\sum_{k=1}^{N} \vec{F}_k + \vec{R}_A + \vec{R}_B + \sum \vec{F}_k^{u} = 0$$

$$\sum_{k=1}^{N} \vec{m}_0\left(\vec{F}_k\right) + \vec{m}_0(\vec{R}_A) + \vec{m}_0(\vec{R}_B) + \sum_{k=1}^{N} \vec{m}_0\left(\vec{F}_k^{u}\right) = 0$$

$$\sum_{k=1}^{N} F_{kx} + X_A + X_B + My_c\varepsilon + Mx_c\omega^2 = 0;$$

$$\sum_{k=1}^{N} F_{ky} + Y_A + Y_B - Mx_c\varepsilon + My_c\,\omega^2 = 0;$$

$$\sum_{k=1}^{N} F_{kz} + Z_A + Z_B = 0;$$

$$\sum_{k=1}^{N} m_x(\vec{F}_k) + Y_A h_A - Y_B h_B + \varepsilon \cdot I_{xz} - \omega^2 I_{yz} = 0;$$

$$\sum_{k=1}^{N} m_y(\vec{F}_k) - X_A h_A + X_B h_B + \varepsilon \cdot I_{yz} + \omega^2 I_{xz} = 0,$$

$$\sum_{k=1}^{N} m_z(\vec{F}_k) - \varepsilon \cdot I_z = 0$$