na votujícím kotoučí 4.2 - Kyvallo bod na kvužnici:  $x_{z} = M.cos(wt)$ Sz=N. sin (wt) koner kyv. rel. k bodn na koninici' The state of the s  $x_k = k$ .  $sin(\varphi)$ 3h=- L. cos(4) x=-n.sin(wt).w+l.cos(4),4 X=n,cos(wt) + l. sin(4) 8= m. sin(wt) - l.cos(4) is = n. cos (wt). w + l. sin (4). 4  $L=E_k-E_\rho$ Ep = -m.g. y = -m.g (n.sin(wt)-l.cos(P))  $E_k = \frac{1}{2}mv^2$ 52= X2+32 i2= 22w2. sin2(wt) -2. 2. w. sin(wt). l. cos(θ). 4+ l2. cos(θ). φ2 3<sup>2</sup>= n². w². cos (wt) +2. r w. cos (nt). l. sin(4). 4+ l². sin²(4). (φ²

ν² = ν². w². (sin)(wt) + cos (nt)) + l². φ² (cos 4+ sin² 4) - 2 mw l. sin(wt). . cos 4.4 + Znwl.cos(wt). sin 4.4 ~ ~ ~ ~ ~ ~ ~ + l2. 42 - 2 mwl-sin(wt). cos(4). 4 + 2 mwl. cos(wt). . sin(4). 4 ~ ~ ~ ~ + l2 p2 + 2 ~ w l 4 sin (4+wt) E4= 2m ( ~2 w2+l2. 42+2nwl. 4.5ia (4+w+)) L= = = ( ~ w + l 2. 4 + 2 mw l. 4. sia (4+w+)) + m. g ( r. sin (w+) - l. cos(4)) 1-1  $\left(1-2+026^2+2\right)$   $\left(1-2+026^2+2\right)$   $\left(1-2+026\right)$   $\left(1-2+026\right)$   $\left(1-2+026\right)$ 

L-IMIN WILL TENWX, T. SIMIT (WIT) (MING/CISTALOUT)

Lagr. bornice #. dunha:

$$\varphi \colon \frac{d}{dt} \left( \frac{\partial \zeta}{\partial \dot{\varphi}} \right) - \frac{\partial \zeta}{\partial L} = 0$$

$$\frac{\partial \mathcal{L}}{\partial \dot{\varphi}} = m \mathcal{L}^2 \dot{\varphi} + m. m. w. \ell. \sin(\varphi + w + \varphi)$$

$$\frac{d}{dt}\left(\frac{\partial L}{\partial \dot{\varphi}}\right) = m L^2 \ddot{\varphi} + m.m.w.l.\left(cos(\ell + w + t) \cdot \dot{\varphi}\right)$$