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In Article pryvedenы poluchennыe Results of research эksperymen- talnыh Quantity proydennыh korneplodov for otzhymalnыm Waltz through the gap Between screw and working vetkoy podayuscheho conveyor kombynyrovannoho cleaner korneplodov heap.

Cleaner heap korneplodov, korneplodы, screw, otzhymalnыe valtsы, diameter, velocity Whatnot treatment.

In paper the got results of experimental researches of amount of passed root crops are driven to extraction rollers through gap between screw and working branch of giving conveyer of combined purifier to lots of root crops.

Purifier to lots of root crops, root crops, screw, extraction rollers, diameter, angulator of appeal.

UDC 531,396, 534.014.4, 534.015.1

DynamicICHNA MODEL OF bunk, suspended on a flexible suspension, while turning taps

VS Loveykin, PhD Y. Chovniuk, Ph.D.
APLymar V., V. Melnichenko, masters

Grounded physical-mechanical model describing possible types of movement bunk, suspended on a flexible suspension, when you turn the tap. To analyze the kinematics and power characteristics of the movement of the method of phase portraits (classical and higher orders). Using the obtained models of cranes for optimum motion control can significantly improve their performance and reliability.

MoDel, movement, cargo, flexible suspension, turn, grapple.

Resolutionska problem. The state of lifting - transport equipment needs further improvement of mathematical models of technological processes management, performance and positioning accuracy load when you turn the tap. Solving these problems requires further analysis of dynamic traffic load on flexible suspension in a horizontal plane accelerated when you turn the tap. There is also a need for calculating the natural vibrations that occur when rocking cargo along the rotational motion of a portable boom crane system. Current analysis of mechanical systems "boom crane - clamshell" makes it possible to determine the dynamic loads on the main elements of the supporting structure of the crane.

One reason for the reduction in productivity and reduced reliability grab crane hanging is just rocking
load on flexible suspension (rope). For jib cranes most
characterized by a buildup of delight with the load while turning his arrows. In addition to the action of centrifugal force, Coriolis force arising when turning boom crane for cargo also true inertial force through which the rope angle from vertical maximum at start / stop mechanism for turning the tap. Oscillating weights that are complex spatial movement.

DTo reduce vibrations, you can extend the transition process, but it increases the duty cycle, which in turn reduces the performance of the mechanism, but increases its reliability. Currently used with electric mechatronic information management system that allows you to specify
aboutgram motor control mechanism for turning the tap, as well as by the regulated modal regulator effectively extinguish unwanted vibrations load on flexible suspension. Of course, such a program for drawing traffic control crane needs to find its mode of rotation, which would take into account the impact of its design features and ensure improved performance and reliability of the crane, and ease of management by the mechanism.

DFor the task requires knowledge of generalized equations of motion that take into account the whole range of forces acting on grapple with the load suspended on a flexible suspension crane. Similar equations can accurately describe the behavior of a real load of crane.

AnaLiz recent research. Calcsettlements approaches that take into account the influence of the centrifugal forces of inertia on the nature of fluctuations
cargo crane jibs in turn, presented in [1-10]. In the

[11] analyzed the dynamic modes swinging load in the horizontal plane vibrations with the influence of the Coriolis acceleration relative to the trajectory of cargo on a flexible suspension. The authors [12,13] justify the equations of motion of cargo on a flexible suspension when turning the tap, but excluding the Coriolis force. It should be noted that in [11] the uniform rotation of the crane boom, and in [13] - is uneven.

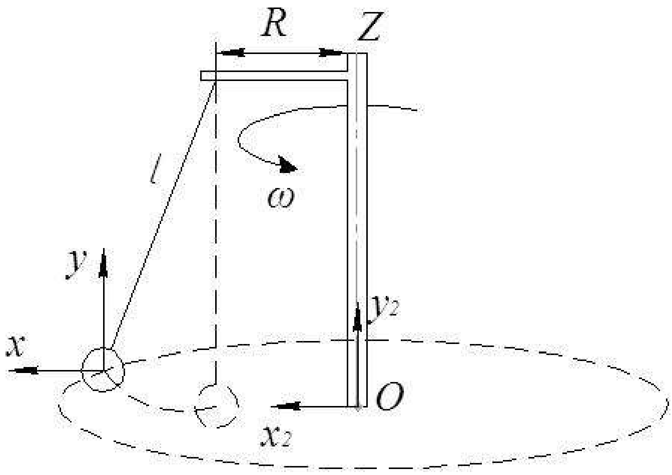
Metand research. Justification mathematical model that descriptionis dynamic and determines the type of relative trajectory grapple with the load on flexible suspension at different modes of rotation of the crane boom in the horizontal plane vibrations (while taking into account both the relative rotation of the vertical plane load fluctuations and the impact of the type Coriolis acceleration relative path load that is swinging on flexible suspension). For the purpose of application of the method (classical) phase portrait and the method of phase portraits of higher order, the first of which is used in [13].

Rezultaty research. *Pivnyannya horizontal vibration loaju on flexible suspension under uniform turn boom crane.* Usestovuyuchy results of [11], which takes into account the effect of Coriolis equation of horizontal vibration load on flexible suspension under uniform turning crane jibs can be represented (in the absolute coordinate system *(y2, x2)*) As follows:

$$
\begin{cases}
\ddot{x}_2 = \dot{y}(-\omega_l)\sin(\omega_l t) + \left(R + y + yd_{\text{őï}}\right)\times \\
\times\left(-\omega_l^2\right)\cos(\omega_l t) + \ddot{y}\cos(\omega_l t) - \dot{y}\omega_l\times \\
\times\sin(\omega_l t) + \ddot{x}\sin(\omega_l t) + \dot{x}\omega_l\cos(\omega_l t) + \\
+\omega_l \dot{x}\cos(\omega_l t) - \omega_l^2 x\sin(\omega_l t); \\
\ddot{y}_2 = \dot{y}\omega_l\cos(\omega_l t) + \left(R + y + yd_{\text{őï}}\right)\times \\
\times\left(-\omega_l^2\right)\sin(\omega_l t) + \ddot{y}\sin(\omega_l t) + \dot{y}\omega_l\times \\
\times\cos(\omega_l t) - \ddot{x}\cos(\omega_l t) + \dot{x}\omega_l\sin(\omega_l t) + \\
+\dot{x}\omega_l\sin(\omega_l t) + x\omega_l^2\cos(\omega_l t); \\
\ddot{x} - 2\omega_l\dot{y} - \omega_l^2 x = -\dfrac{g}{l}x \\
\ddot{y} + 2\omega_l\dot{x} - \omega_l^2 y = -\dfrac{g}{l}y
\end{cases}
$$

$$
yd_{\text{óï}} = \frac{\omega_l^2 R l}{(g - \omega_l^2)}, \qquad (1)
$$

where ω_1- Uniform angular velocity of rotation of the crane boom about a vertical axis *OZ*; (*x2, y2*)- Coordinates of goods in fixed coordinate system (inertial) *(x, y)* - Cargo generalized coordinates (rectangular); *R*-Radius of rotation of the suspension point of the rope to the crane boom in the horizontal plane relative to the axis of rotation.



Ric. 1. The dynamic model mechanism for turning the tap.

Prand numerical analysis on a PC system (1), the following initial conditions and values of output parameters [11]:

$$\omega_l = 0,209\ ðàä/ñ; R = 20ì;\ l = 20ì;$$

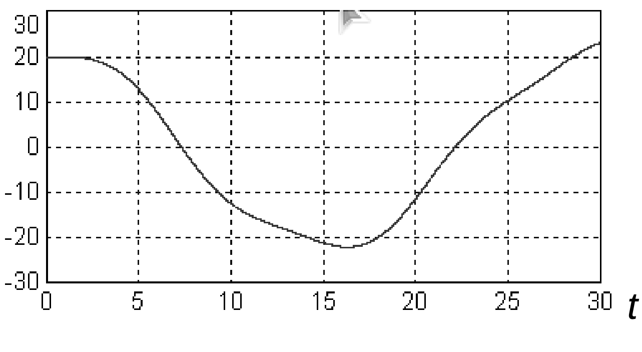
$$x\big|_{t=0} = 0;\ \dot{x}\big|_{t} = -\omega_l R \tag{2}$$

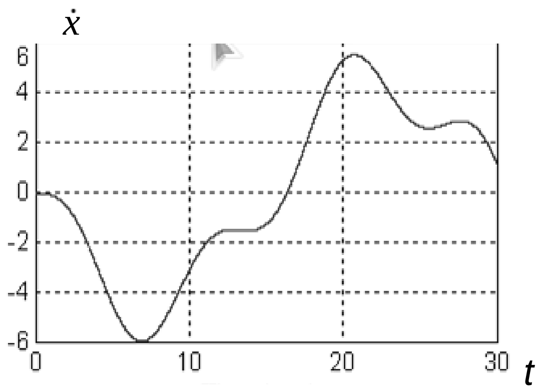
$$y\Big|_{t=0} = -\frac{\omega_l^2 R l;}{\square\ \omega_l^2 l} = .0018ì;\quad \cdot\Big| = 0.$$

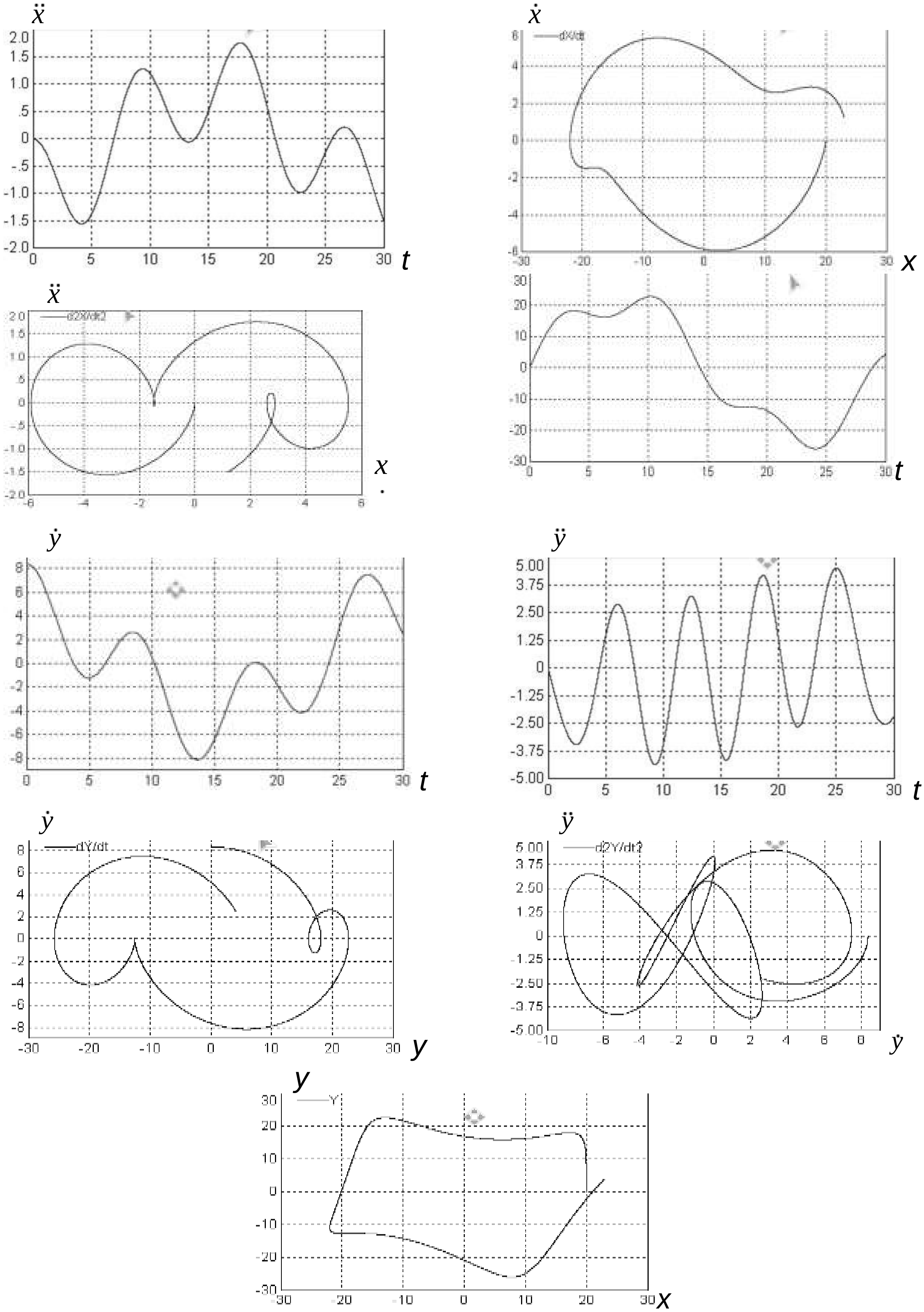
In this case also there is a resonance, but only if:

$$g = \omega_l^2 l. \tag{3}$$

ConstructDepending mo *x (t), in (t*) And their phase portraits of the system along these coordinates for parameter values (2) and corresponding initial conditions based on the Coriolis force at a constant speed of rotation:







Ric. 2. Dependence *x (t)*,*y (t)* tand their derivatives on *t*the second order inclusive, corresponding phase portraits (including higher orders for both coordinates), the trajectory equation *y (x)*.

Andstitutionalism graphs in Fig. 2 shows that the data values of the parameters (*ω1, R, l*) Observed fluctuations in load horizontally (*xln)*. Phase portraits *(X,*$\dot x$*)(Y,* $\dot y$*),*$(\dot x,\ddot x)$.
$(\dot y,\ddot y)$: Having a form of closed lines, indicating that cyclic pyx system.

Pivnyannya horizontalthem oscillationsb loaju to flexibleuchkomu suspension in uneven turning crane jibs. Prand taking into account dependence *ω1= Ω 1 (t)* typein (4).

$$\omega(t)=\omega_0\sin^2\left(\frac{\pi}{2t_ï}\right); \qquad (4)$$

$$\omega_0 = 08ðàä/ñ \quad 0 < t \le t_ï$$

and $\dot\omega_l(t)$ typein (5)

$$\dot\omega(t)=\omega_0\frac{\pi}{2t_ï}\sin\left(\frac{\pi t}{t_ï}\right),\ 0 < t \le t_ï. \qquad (5)$$

$$\begin{cases}\ddot x_1-\dot\omega_l(R+y_1)-2\omega_{l1}\dot y_1-\omega_{l1}^2x_1=-\dfrac{g}{l}x_1;\\ \ddot y_1+\dot\omega_l x_1+2\omega_{l1}\dot x_1-\omega_l^2(R+y_1)=-\dfrac{g}{l}y_1,\end{cases} \qquad (6)$$

where *x1, Y1* - Non-inertial coordinate system with a non-uniform speed. The initial conditions for the system (6) as follows:

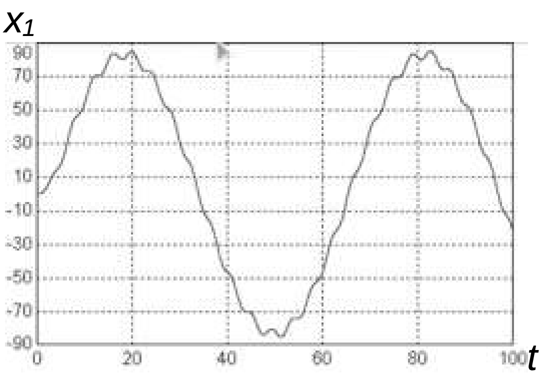
$$x_1\big|_{t=0}=0 \quad \dot x_1\big|_{t=0}=0 \quad y_1\big|_{t=0}=0; \dot y_1\big|_{t=0}=0 \qquad (7)$$

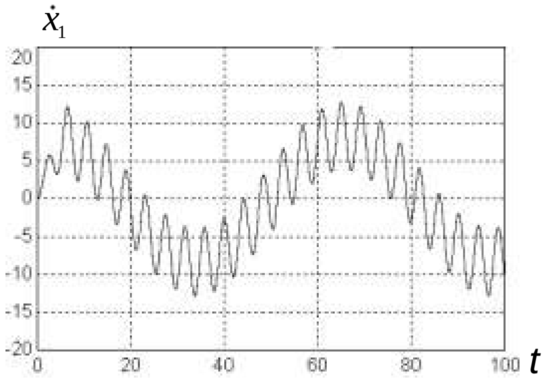
Pislya integration on a PC (6) can be found expressions for the coordinates of a cargo plane *(x2, y2)* (in the absolute coordinate system):

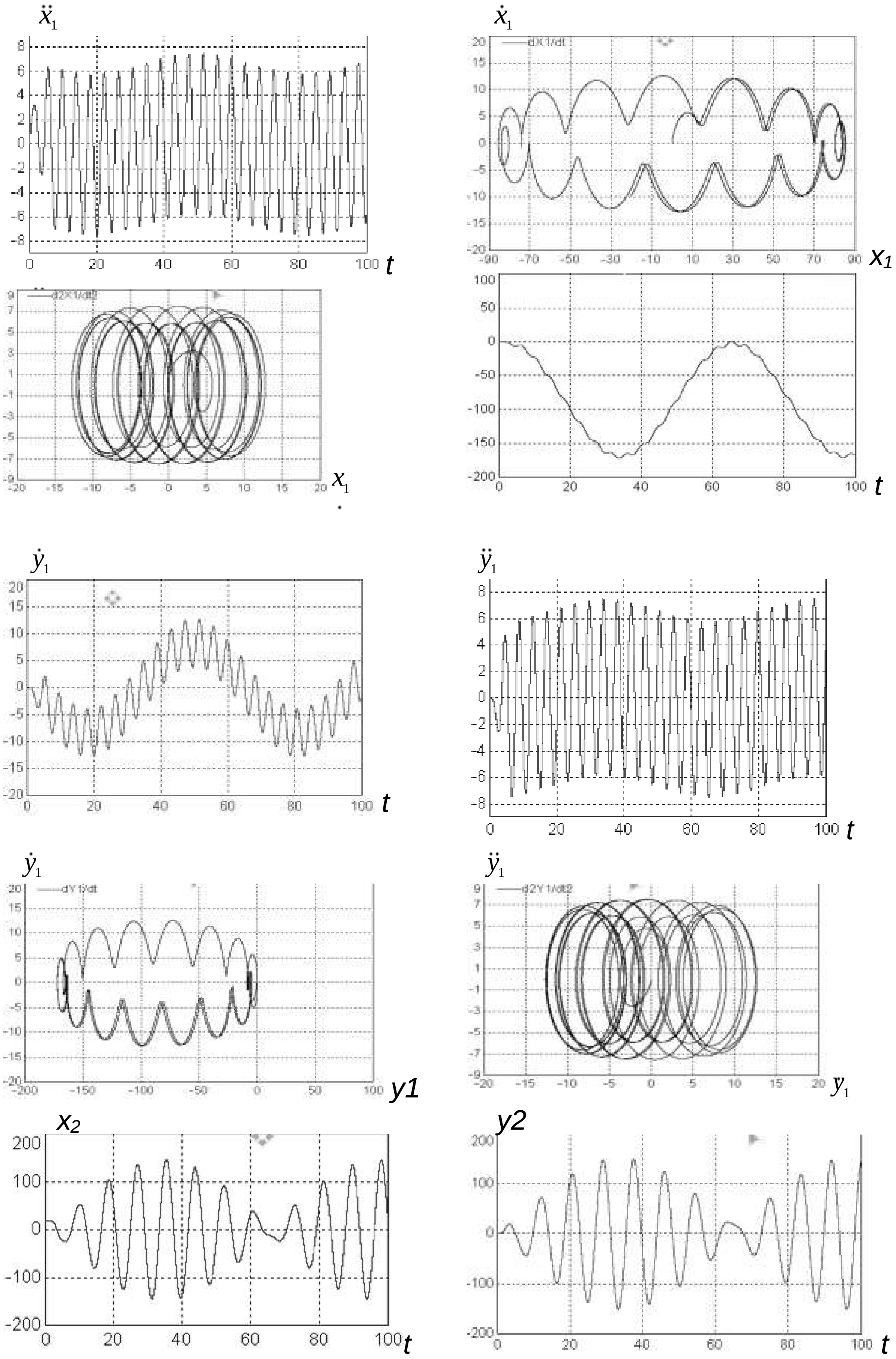
$$\begin{cases}x_2(t)=(R+y_1)\ \mathrm{Cos}(\omega_l t)+x_1\sin(\omega t);\\ y_2(t)=(R+y_1)\ \mathrm{Sin}(\omega_l t)-x_1\cos(\omega t);\end{cases} \quad \omega=\omega_l(t); x_1=x_1(t); y_1=y_1(t), \qquad (8)$$

and the trajectory equation *y2 (x2)* vantazhu.

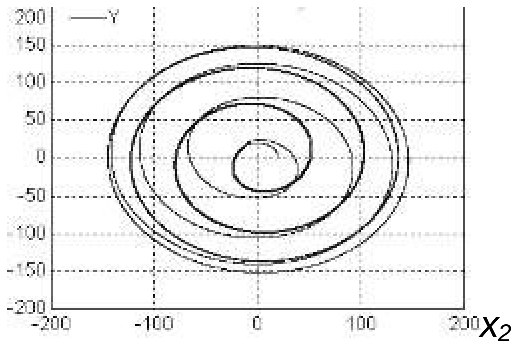
Graphand Categoriesand to Categoriesandfoot ryc. 3 prevhis treatment inlanguages:
ω0= 0.8 rad / s, *tSection*= 5 s, *l*= 20m,*R = 20*m.







$\ddot{x}_1$
t
$\dot{x}_1$
dX1/dt
x_1
d2X1/dt2
x_1
t
$\dot{y}_1$
t
$\ddot{y}_1$
t
$\dot{y}_1$
dY1/dt
y1
$\ddot{y}_1$
d2Y1/dt2
y_1
x_2
t
y2
t



Ric. 3. The graph of *x2 (t)*,*y2 (t)* and the trajectory of the load *y2 (x2)* horizontally *(X2, Y2)* to set up the initial conditions (7) and parameters (source) studied system "goods -
flexible suspension "(with variable speed).

From Fig. 3 shows that the laws of motion *x (t), y (t)* are oscillatory (cyclic) nature (corresponding phase portraits of the system characterized by closed trajectories).

Conclusions

1. Applying Lagrange equations of type II and dynamic theorem yielded the Coriolis and numerically integrate differential equations on a PC (absolute / relative) traffic load on flexible suspension crane performing rotational movements with uniform / non-uniform (dependent *t*) Angular velocity.
2. The solution of equations (absolute) traffic load model includes the effect of the initial conditions of the problem, and
have a "resonance" properties that manifest themselves in a strong (amplitude) rocking load, output fluctuations of the horizontal plane when the rotational speed of the crane boom coincides with the natural frequency of oscillation angle (mathematical pendulum) system. Such situations should be avoided in real crane operation, as they can lead to a significant reduction in the reliability of the crane.
3. Resultand this work are the basis for further study of the dynamics of swinging load on flexible suspension, to build diagrams internal force factors bearing structures in his arrows, to analyze static and dynamic characteristics of automatic and manual control systems, as well as to clarify and improve engineering calculation methods
onSimilarly systems, both at the stage of their design / construction and real operation that will improve the performance and reliability of cranes with flexible suspension cargo.

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Obosnovana physical and mehanycheskaya model opysыvayuschaya vozmozhnыe typы movements bunk, podveshennoho at Mount the bending, when turning the tap. For analysis of power characteristics and kinematically ukazannыh movements yspolzovan method fazovыh portretov (klassycheskoho and More HIGH line). Using poluchennыh models cranes for optimum motion control allows us to Significantly povыsyt s proyzvodytelnost and reliability.

MoDel, motion, cargo, Mount the bending, rotation, grapple.

Mechanical and physical models describing possible types of movements of grapple suspended on flexible suspension during process of crane`s turning are proposed. One may use for analysis of kinematic and force characteristics of these movements method of phase portraits (classical and of higher order as well). Using the obtained models of cranes for optimal motion control can significantly improve their performance and reliability.

Models, Movement, cargo, flexible suspension, turn, grapple.

UDC 631,372

EFFECT PARAMETERS movers wheeled tractor INDICATORS FOR compaction

D.In. Shkarivskyy, VG Juror, SP Pogorily, Ph.D.

Statementbut the results of experimental studies that have established that when equipment wheeled tractors HTZ Class 3 tires 15,5R38 soil density was 1.63 ... 1.65 g / cm3 in the layer 0-10 cm, replacement tire 15,5R38 tire 23 1R26 density has reduced by 6% as replacement tires 15,5R38 tire 66h43.00LR25 has reduced density 7 ... 13%. The same dynamics obtained in the 10-20 cm layer, but with a smaller increase, and the layers of 20-30, 30-40 and 40-50 cm ratio is not significantly different from control.