**The laboratory work 8**

A system is given out of a cargo of mass m, connected with a weightless rigid, resiliently supported beam. Let 2l be the length of the beam, and c0 – the coefficient of rigidity of the spring. One end of the beam is fixed to a hinge located on a fixed support.



At the initial moment of time, there is a single vertical impact on the load with the magnitude of the instantaneous impact impulse S. The speed of the cargo receives an instantaneous increment, from which the initial conditions follow:



where φ is the angle of deviation of the system from the equilibrium position. The motion of the system is described by the following equation: $4m\ddot{φ}+c\_{0}φ=0$;

25 seconds after the start of the oscillations, the mass of the load m instantaneously decreases by 50%. Further the movement of the system continues, but already with the load of a new mass.

If the angle φ becomes larger than the limiting value $φ\_{max}=\frac{S}{\sqrt{c\_{0}ml}}$, the system is destroyed.

Construct a model of the "beam-load" system, as well as a model of a system consisting of two "beam-load" systems, unconnected with each other. The second beam with a load is identical to the first one, except that a blow to the load in it occurs 10 seconds after the impact of the load in the first "beam-cargo" system.

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| --- | --- | --- | --- | --- |
| Variant | L | M | C0 | S |
| 1 | 10 m | 2 kg | 1.6 $kg/s^{2}$ | $$30 N\*s$$ |
| 2 | 2 m | 9 kg  | 1.2 $kg/s^{2}$ | $$6 N\*s$$ |
| 3 | 8 m | 2 kg | 1.3 $kg/s^{2}$ | $$13 N\*s$$ |
| 4 | 4 m | 4 kg | 1.1 $kg/s^{2}$ | $$21 N\*s$$ |
| 5 | 7 m | 5 kg | 1.5 $kg/s^{2}$ | $$33 N\*s$$ |
| 6 | 11 m  | 3 kg | 1.4 $kg/s^{2}$ | $$15 N\*s$$ |
| 7 | 5 m | 6 kg | 1.6 $kg/s^{2}$ | $$27 N\*s$$ |
| 8 | 9 m | 3 kg | 1.5 $kg/s^{2}$ | $$2 N\*s$$ |