Title: Will Newton's second law apply to this situation ? Edited

Abstract: The article aims to show that Newton's second law as well as Newton's third law do not apply to a specific situation on physics. Edited by adding the equation.

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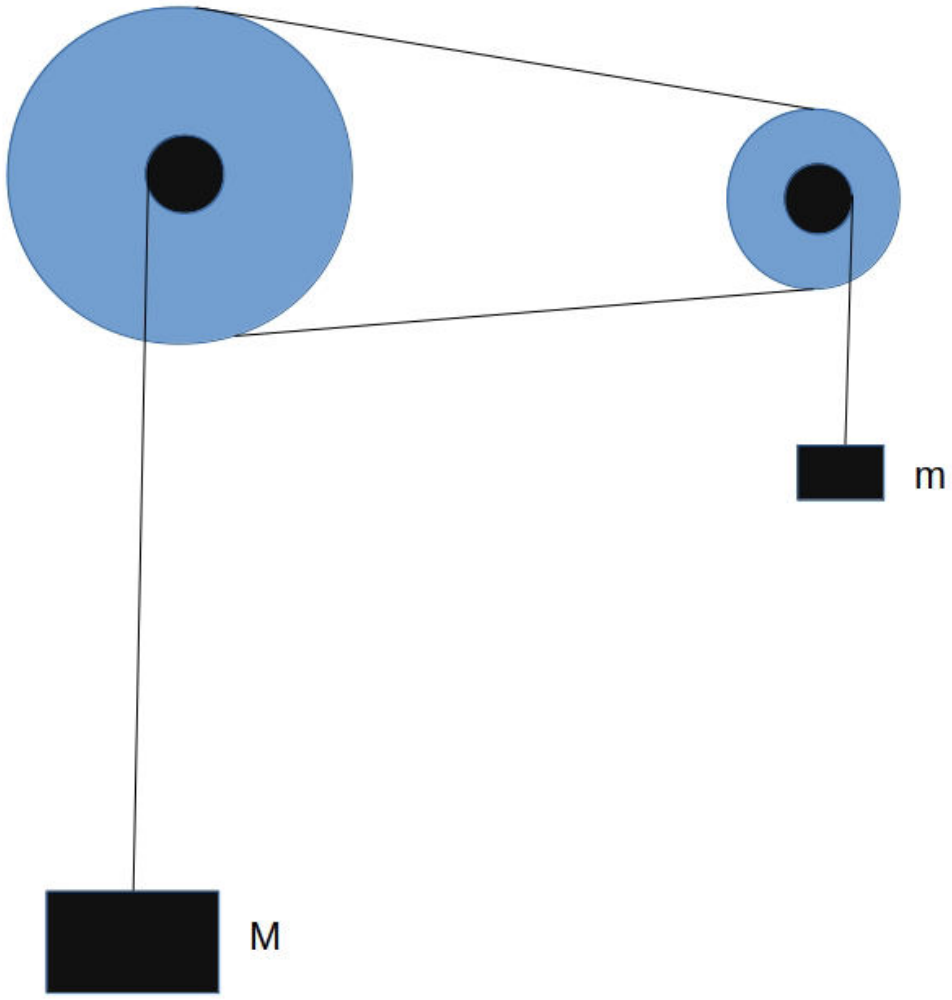
Article :

The equation :
F=ma won't apply to this situation.
Mass M and mass m will have the acceleration A and a according to pulley ratio since they start from speed zero meters per second and the speed ratio is always the same according to pulleys' ratios.

I think of the same system as follows :
The mass M has acceleration say 4 m/s.s after three intervals of time 1, 2,3 seconds its speed becomes 4 , 8, 12 m/s respectively think of any other system connected in such way , let say pulley ratio is 1:4
then when pulley #1 has speed 4m/s then P2 will have 16 m/s according to pulley ratio , when P1 has 8 m/s P2 has 32 m/s , P1 has 12 m/s , P2 has 12*4=48 m/s , let's calculate acceleration on P2:
time intervals are 1,2,3 speeds are 16,32,48 respectively , a=16 m/s.s which is =A*4
At that case the equation F=ma won't satisfy for mass m, i.e force on mass m won't equal to its mass multiplied by acceleration:
Let's have mass M is 4 times mass m. M=4m, let the ratio this time be 1:6
force on mass M is its weight minus gm/6=gM-gm/6
A=F/M=(gM-gm/6)/M=(gM-gM/24)/M= (1-1/24)g
force on mass m is 6gM-gm
a=F/m=(24gm-gm)/m=23g
A is not equal to 6 times a as it should be above.

"The reason is because the third law won't apply as well , objects do not exert the same force however a force according to the pulley ratio , another law should be presented for such situations where the action and reaction are not equal, objects M and m do not touch directly so that there is equal action and reaction"



Think of a gearbox for speed reduction with very low speed and very high torque , the output gear will have acceleration relative to the input gear according to

gear ratio , but the output gear will have very large torque and very large force , in that case F=ma for the output gear won't satisfy. because when I increase gear ratio mass is constant , but acceleration decreases and force increase: F=ma m constant , acceleration decreases F should decrease as well ,but F increase according to gearbox ratio " torque " then the equation is invalid.

Acceleration on the output gear is 1/(gear ratio) times acceleration on the input gear, but force is (gear ratio)*force on input gear , when increasing gear ratio acceleration on output gear decreases but on the same gear the force increases, but that makes the equation F=ma invalid.
Also the third law does not apply , because I exert force on mass on output gear by touching input gear but the output mass do not push me with the same force , however with a force related to gear ratio, inertia of the output mass would be small.

Let say I have torque of 50 N.m and I put a mass at the gear edge 1 meter away from the center , then the net force is 50 newtons. but this 50 newton doesn't give the actual acceleration which should be according to F=ma
Another mass at the input gear will obtain the actual acceleration but inertia of first mass on it is smaller than normal.
The real problem is inertia is different than the actual value when mass m affects on mass M through gearbox , force of mass m on mass M is different than the reaction of mass M on mass m.

The equation in such case should be :

net force = (ratio-1)F1+F2

F2= mass times acceleration of the output gear.

F1=force on the input gear

if the ratio is 1:1 then the net force only equals F2= ma