

**Title:** The Theory of Gearbox

**Abstract:** The article aims to present a brief introduction to my theory of gearbox

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**Article:**

Let say we have a gearbox of total ratio 1:4 , and we have input acceleration of  $a$  and output acceleration of  $A$  , then :

$$A=0.25a$$

$$F=4f$$

So why the acceleration decreased but the force increased ?

When mass  $m$  on the input gear exerts force on mass  $M$  on the output gear through a gearbox for speed reduction of ratio say 1:4 , then the reaction of mass  $M$  on mass  $m$  is smaller than if they exert force on each other by a normal contact at a normal contact force exerted by mass  $m$  on mass  $M$  equals reaction of mass  $M$  on mass  $m$ , but in the case of gearbox the reaction is smaller than the force exerted .

Because inertia and resistance of mass  $M$  is small mass  $m$  will have the opportunity to exert more and more force making  $F$  bigger than  $f$ , if the ratio is 1:4 as above then  $F=4f$  .

And because the inertia and resistance of mass  $M$  is small , in gearbox contact mass  $M$  tends to absorb motion than to reflect it , when absorbing motion , mass  $M$  tends to not to move from its position making motion little and acceleration small , but when reflecting it in case of normal contact it will again reflect and hit mass  $M$  making it move faster and with larger acceleration.