

The Power of Gears in Double Elimination

Sriram Avirneni

DeWitt Perry Middle School

culpd@cfbisd.edu

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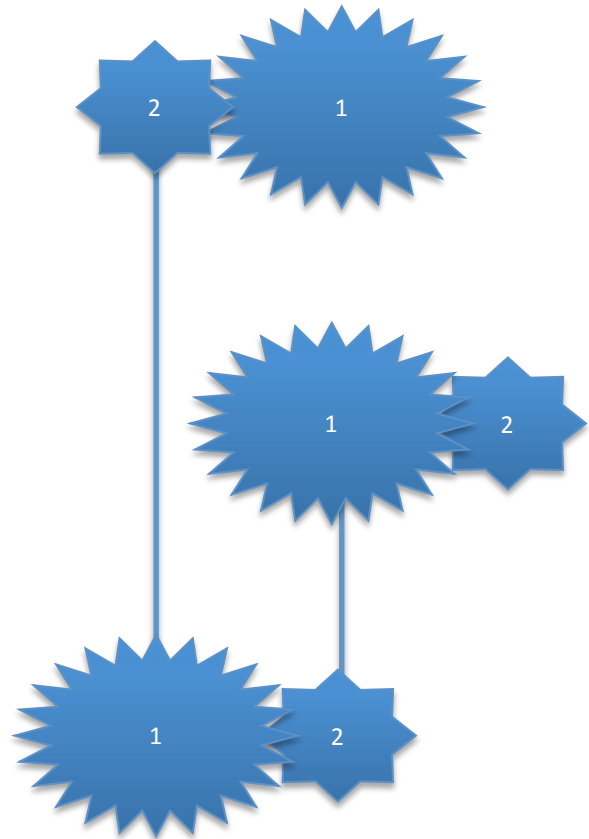
To be honest, our robot's motors are highly inefficient or in other words, slow. With slow robots most people can't win in double elimination because the opposing team could beat them to the points. To combat this problem many people have used different methods such as pulleys, using multiple motors, crazily large numbers for speed, using tank treads, etc. Every year we receive multiple gears and yet, not that many people use them for increasing the efficiency of our motors, most don't even use them at all. I believe that there are many uses for them including increasing the efficiency of our motors, making faster turns, and cutting back on motor usage.

First of all, there is the problem to be solved of inefficient motors, as I have said multiple times now, which can be solved by lining gears up in a certain order. First you want the motor to spin a large gear, maybe a 24 tooth gear; this gear will connect with a smaller gear, for example an 8 tooth gear, the larger the difference in size the more efficiency. After that the 8 tooth gear will be attached to a rod which attached to another 24 tooth gear connecting to an 8 tooth gear. This can be continued as much as you want, the more times it is repeated the more efficient. The efficiency, which in my equation is represented as rotations, is 3 rotations for every time you line up the 8 tooth gear and 24 tooth gear. The equation is the input gear's number of teeth divided by the output gear's number of teeth. This will also allow for much faster robots meaning better double-elimination runs because it can get the points much faster.

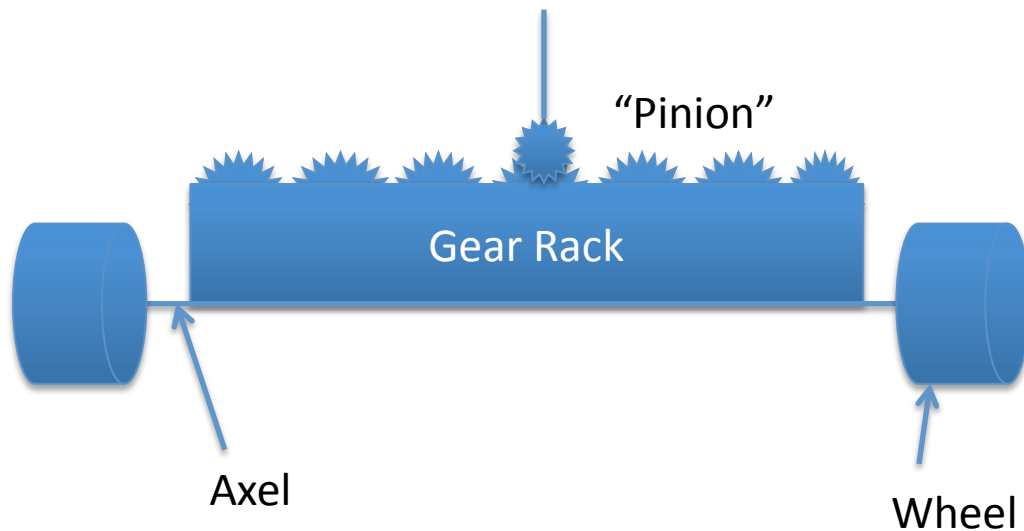
Second, we have the problem of not enough motors. Well why not use gears? You could have one motor turn one gear and by placing gears in multiple angles and sequences. That way you can control multiple actions, such as a claw opening while being lifted, with one servo/motor. You can also use the sequence I mentioned before to change how much one will move compared to another. This allows for many different contraptions, maybe all of them, to be controlled by a single motor/servo increasing the amount you have extra in case some break.

This is the gear order used in the contraptions described in both of the above paragraphs

Figure 1: 1-Input Gear 24 Teeth
2-Output Gear 8 Teeth



Finally we have the problem of tight turns. We can just do the normal thing where one wheel turns one direction while the other turns the opposite direction. This wastes time and it is hard for the robot to turn with this strategy. What this calls for is some gears! What you can do is make a mechanism with a gear rack similar to a rack and pinion. With this you can attach it to the axle of the wheels. This way you can control the turning of the car while it moves allowing for tighter turns and faster turn.



Contraption for steering

This can be very useful for most games in double elimination. What's better is the combination of these theories. You would use the combination of the first and second to create a claw that can lift and close, lower and open with one servo. They will have different lengths of the gear line up I mentioned before so that the claw opens and closes faster than it is lifted. Then we can implement the way the robot can turn faster to move across the board quickly while picking up poms with the claw. The robot will then place the poms in the scoring area as the enemy team's robot tries to pick up poms you already picked up.

In conclusion we can use this to succeed in high speed, race to the points situations. You're probably wondering, what would happen if everybody used the same strategy? It would matter about how many times the gears are lined up. It would also matter on the teams planning capabilities so that they know how to fit all the gears in the robot and how to conserve gears for certain tasks such as grabbing Botguy or scoring poms. This adds a new need for more skillful builders, which adds more rigors to the learning that is already provided from Botball.