A Review on Types of DC Motors and the Necessity of Starter for Its Speed Regulation

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ABSTRACT: ***It is important to lift the speed of any engine from zero and get it to its operating speed. As the start of an engine, named. The speed of DC motors can be regulated either by changing the voltage or by changing the voltage over a broad range. The shifting power of the winding current. DC motors were initially powered by existing direct current control. Distribution method, so the first to be commonly used were these engines. A DC engine is a self-starting engine, although some external strategies for starting the DC motor are used. This paper discusses the various kinds of DC motors and the different forms of DC motors. These DC motors need an external starter.***

KEYWORDS: DC Motors, Speed Regulation, Armature, Field winding

INTRODUCTION

The DC motor has been generally utilized as a section of industry notwithstanding despite the way that it's up keep charge is higher than the inciting. Relating Integral Derivative (PID) controllers have been generally utilizes for speed and position control of DC motor framework. The paper accomplishment is to design a control inspiration utilizing Genetic Algorithm with taking into consideration of non-linearity capable of for the construction. Acquired Algorithm or in diminutive (genetic algorithm) GA is a stochastic compute making an allowance for the models of standard determination and Hereditary qualities. The Genetic Algorithms (GAs) are a stochastic general pursue procedure that imitates the strategy of standard change. Utilizing acquired figuring's to perform the tuning of the controller will understand the ideal. The change of psyche blowing torque execution the drives is astoundingly enter expanded and storing up utilized and other reason applications, for case, electric trains steel moving assembling plants, and, misshapen controllers.

The bulk of the mechanical growth seen around us is achieved by an electric motor. Electric engines convert one energy source into another. An electric power outlet the engine is a machine that converts electrical energy into electricity. Energy from mechanics. Motors are narrowly divided into two engines, the types of AC engines and DC engines. Operating the AC motors Where the DC motors operate on an alternating current that's a direct current. Alternating the input to the AC motor is in the form of torque, current/voltage and its output are DC motor output is similar and differs from the AC motor output. The input side of the motors, i.e. the input of a DC motor, is the Current/voltage direct. This paper only focuses on DC Engines, types and speed control of these engines.

There are four different types of DC motor.

1. Permanent Magnet Motor

2. DC Series Motor

3. DC Shunt Motor

4. Compound Motor

Most of the DC motors have same internal mechanism. The working principle of DC motors is based on Fleming's left hand rule. Speed Regulation of a DC motor is the change in speed when the load on motor is reduced from rated value to zero, it is expressed in % of rated load speed. % speed regulation = No load speed −Full load speed Full load speed x 100

Permanent Magnet Motor:

There is no field winding on a permanent magnet motor; instead, to supply the field flux, it uses permanent magnets. There is a good starting torque for the permanent magnet motor alongside with a better velocity. As the supply in the field is fixed because of Permanent magnet, and this engine does not vary, they do not

have an adjustable control function for speed. Thus, the in small motors, permanent magnet field is well liked[1].

However, large permanent magnets are costly, as well as dangerous and difficult to be assembled, this favors wound fields for large machines.

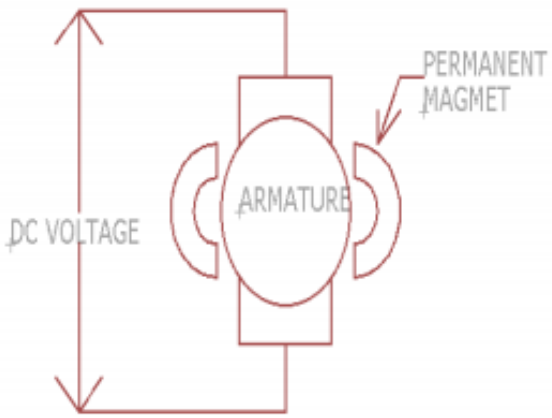

Fig. 1: Permanent Magnet Motor

For small motors, permanent magnets are ideally suited to the power consumption of the field windings is eliminated. To reduce the total weight and height of a permanent magnet high energy magnets can be used by motors[2].

DC Series Motor:

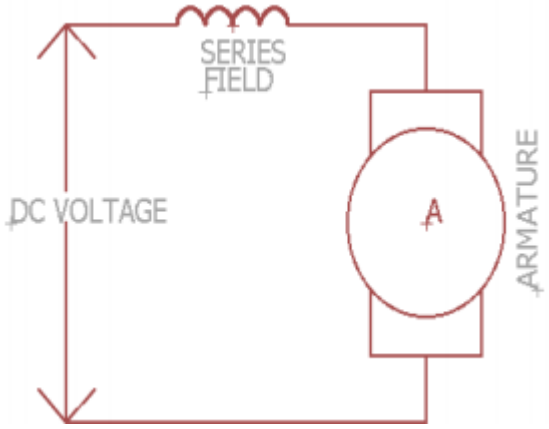

Fig. 2: DC Series Motor

The series motor is generally referred to as a series wound motor. The field winding is connected to a DC series engine in winding sequence to the armature. The pressure of the field differs with the difference in the current of the armature Motor sequence it provides elevated starting torque and is widely used for initiating heavy loads of inertia, such as trains, elevators, etc[3]. A series engine speed varies widely between the no loads and the requirements for maximum loading. Unable to use the series engine where a constant speed under varying loads is required, this is because the speed of this engine varies considerably with the load varying. With no load, a series motor should never be started, the current is low with no mechanical load, so the Back emf is weak and the armature begins to rotate more quickly to appropriate back emf is generated to balance the supply voltage, and because of over-speed, the engine may get hurt[4]. The velocity of a series engine with no load increases to a point therefore, any load where the engine could get damaged A DC series motor should always be connected. As they are universal motors, the series motor is also known as well as alternating current, it can also be run on with direct current. Since the voltage of the armature and field at the same time, direction reverses, torque is continually generated in the same direction, but at lower levels, it runs speed with low torque on the supply of AC relative to the supply of AC supply to DC Series

motors have many advantages such as it has high starting torque, motor is cost efficient, easy to design and maintain, simple construction, etc. For small motors, permanent magnets are ideally suited to the power consumption of the field windings is eliminated. To reduce the total weight and height of a permanent magnet high energy magnets can be used by motors. The biggest downside of the permanent magnet DC motor is that because of its load level, they are limited to the amount of load[5]. A smaller size was favored. It is also found that these motors they have applications of low horsepower. A further downside it is that its torque is limited to 150% of the torque rated to prevent demagnetization of the permanent magnets under which the magnets are used the engine. Engine sequence. Because of its potential for self-regulation, motor switching from no load to full load conditions. Its running speed does not change dramatically. As the shunt field coil consists of thin wire that cannot be made up of as in the DC series engine, producing large current for starting, this suggests that DC shunt motors have exceptionally low levels of shunting. The best-speed DC shunt motors are ordinance[6].

This paper offers an overview of the need for a DC starter Engines. Different starting approaches that are widely used with dc motors. It also incorporates a soft starting technique. A system based on a thermistor trigger. The paper provides the study of the various forms of starters used in industries, i.e. 3-starter coil and 4-starter stage. The paper also discusses why the engine burns if the starters start they aren't included [7].

CONCLUSION

It can therefore be inferred from this paper that most of the external starter is needed by DC motors to indicate Application, only for the initial 5 to 6 seconds and then for these the starters can be cut off later. Starter offers a protected starter, Initiate the supply voltage from zero to nominal voltage. It also has a starting current is limited to a safe value until the DC motor Achieve rated torque and rpm. Might have the same method even repeated during a motor stop in order to ensure that the motor stops the starting and stopping of smooth, jerk-free, managed motors with DC.

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