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90 DEGREE CAR PARKING MODEL

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Abstract - Here we fabricate the model for 90 degree car parking system for automobiles. It is nothing but the steering control with four wheel drive. It is a new innovative concept which is mainly used for four wheeler vehicles. Four-wheel steering is a system employed by some vehicles to improve steering response, increase vehicle stability while maneuvering at high speed, or to turn at low radius at low speed. In most active four-wheel steering systems, the rear wheels are steered by a controller and actuators. This allows the vehicle to turn in a significantly smaller radius, sometimes critical for large trucks or tractors and vehicles with trailers. So we are introducing small model of four wheeler steering control through this project.

***Key Words*:** 90 degree steering, low radius.

1.INTRODUCTION

An automobile or motor car is a wheeled motor vehicle for transporting passengers, which also carries its own engine or motor. Most definitions of the term specify that automobiles are designed to run primarily on roads, to have seating for one to eight people, to typically have four wheels, and to be constructed principally for the transport of people rather than goods. However, the term "automobile" is far from precise, because there are many types of vehicles that do similar tasks. Parking is the act of stopping a vehicle and leaving it unoccupied for more than a brief time. It is against the law virtually everywhere to park a vehicle in the middle of a highway or road; parking on one or both sides of a road, however, is commonly permitted. Parking facilities are constructed in combination with most buildings, to facilitate the coming and going of the buildings' users. Steering is the term applied to the collection of components, linkages, etc. which will allow for a vessel (ship , boat) or vehicle(car) to follow the desired course. An exception is the case of rail transport by which rail tracks combined together with railroad switches provide the steering function. The most conventional steering arrangement is to turn the front wheels using a hand operated steering wheel which is positioned in front of the driver, via the steering column, which may contain universal joints to allow it to deviate somewhat from a straight line. Other arrangements are sometimes found on different types of vehicles, for example, a tiller or rear wheel steering. Tracked vehicles such as tanks usually employ differential steering that is, the tracks are made to move at different speeds or even in opposite directions to bring about a change of course.

2. COMPONENTS AND WORKING

MOTOR

An electric motor uses electrical energy to produce mechanical energy. The reverse process using mechanical energy to produce electrical energy is accomplished by a generator or dynamo. Traction motors used on locomotives and some electric and hybrid automobiles often performs both tasks if the vehicle is equipped with dynamic brakes. Electric motors are found in household appliances such as fans, refrigerators, washing machines, pool pumps, floor vacuums, and fan- forced ovens. They are also found in many other devices such as computer equipment, in its disk drives, printers, and fans; and in some sound and video playing and recording equipment as DVD/CD players and recorders, tape players and recorders, and record players. Electric motors are also found in several kinds of toys such as some kinds of vehicles and robotic toys. The principle of conversion of electrical energy into mechanical energy by electromagnetic means was demonstrated by the British scientist Michael Faraday in 1821 and consisted of a free-hanging wire dipping into a pool of mercury. A permanent magnet was placed in the middle of the pool of mercury. When a current was passed through the wire, the wire rotated around the magnet, showing that the current gave rise to a circular magnetic field around the wire. This motor is often demonstrated in school physics classes, but

brine (salt water) is sometimes used in place of the toxic mercury. This is the simplest form of a class of electric motors called homopolar motors. A later refinement is the Barlow's Wheel. These were demonstration devices, unsuited to practical applications due to limited power. The modern DC motor was invented by accident in 1873, when Zénobe Gramme connected the dynamo he had invented to a second similar unit, driving it as a motor. The Gramme machine was the first electric motor that was successful in the industry. In 1888 Nikola Tesla invented the first practicable AC motor and with it the polyphase power transmission system. Tesla continued his work on the AC motorin the years to follow at the Westinghouse Company.

PARKING

Parking facilities include indoor and outdoor private property belonging to a house, the side of the road where metered or laid-out for such use, a parking lot or car park, indoor and outdoor multi-level structures, shared underground parking facilities, and facilities for particular modes of vehicle such as dedicated structures for cycle parking.Automatic parking is an autonomous car maneuvering from a traffic lane into a parking place to perform parallel parking, perpendicular or angle parking. The automatic parking aims to enhance the comfort and safety of driving in constrained environments where much attention and experience is required to steer the car. The parking maneuver is achieved by means of coordinated control of the steering angle and speed which takes into account the actual situation in the environment to ensure collision-free motion within the available space. Automatic parking systems are being developed by several automobile manufacturers. A commercial version of automatic parallel parking was introduced by Toyota Motor Corporation in Toyota Prius in 2004. BMW recently demonstrated its Remote Park Assist system on a 750i. This system initiates parking by keychain remote. Lexus also debuted a car, the 2007 LS, with an Advanced Parking Guidance System. As well in 2007 the V W Touran debuted with an automatic parking system developed by Valeo.

FOUR-WHEEL STEERING

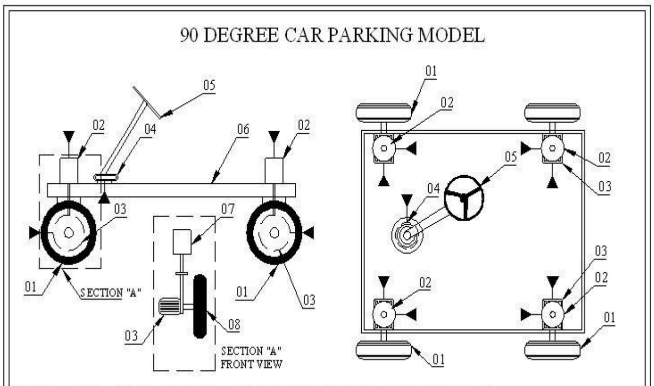
Four-wheel steering (or all wheel steering) is a system employed by some vehicles to improve steering response, increase vehicle stability while maneuvering at high speed, or to decrease turning radius at low speed. In most active four-wheel steering systems, the rear wheels are steered by a computer and actuators. The rear wheels generally cannot turn as far as the front wheels. Some systems, including Delphi's Quadra steer and the system in Honda's Prelude line, allow for the rear wheels to be steered in the opposite direction as the front wheels during low speeds. This allows the vehicle to turn in a significantly smaller radius sometimes critical for large trucks or vehicles with trailers.

POWER STEERING

As vehicles have become heavier and switched to front wheel drive, the effort to turn the steering wheel manually has increased often to the point where major physical exertion is required. To alleviate this, auto makers have developed power steering systems. There are two types of power steering systems hydraulic and electric/electronic. A hydraulic-electric hybrid system is also possible. As vehicles have become heavier and switched to front wheel drive, the effort to turn the steering wheel manually has increased often to the point where major physical exertion is required. To alleviate this, auto makers have developed power steering systems. There are two types of power steering systems hydraulic and electric/electronic. A hydraulic-electric hybrid system is also possible. A hydraulic power steering (HPS) uses hydraulic pressure supplied by an engine- driven pump to assist the motion of turning the steering wheel. Electric power steering (EPS) is more efficient than the hydraulic power steering, since the electric power steering motor only needs to provide assistance when the steering wheel is turned, whereas the hydraulic pump must run constantly. In EPS the assist level is easily tunable to the vehicle type, road speed, and even driver preference. An added benefit is the elimination of environmental hazard posed by leakage and disposal of hydraulic power steering fluid.

WORKING PRINCIPLE

In this project battery provide the power supply to the control unit. The control unit is used to control the motors with help of programmable microcontroller. The vehicle model has totally eight motors, four motors are dc motors coupled with four wheels for giving separate drive for each wheels. These four motors are fixed with small circular clamp at the base of the vehicle body. All the four dc motors are mounted to a servo motor shaft which is used to turn the wheels. When we turn the vehicle steering in left side the front wheels will turn in left side and the rear wheels will turn in right direction to reduce the load with help of servo motors.



S.NO	PART NAME	S.NO	PART NAME	S.NO	PART NAME	
01	WHEEL	04	POT	▶—	TO CONTROL UNIT	
02	SERVO MOTOR	05	STEERING			
03	DC MOTOR	06	BASE FRAME			

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D.C.MOTOR PRINCIPLE

A machine that converts direct current power into mechanical power is known as D.C Motor. Its generation is based on the principle that when a current carrying conductor is placed in a magnetic field, the conductor experiences a mechanical force. The direction iof this force is given by Fleming's left hand rule.

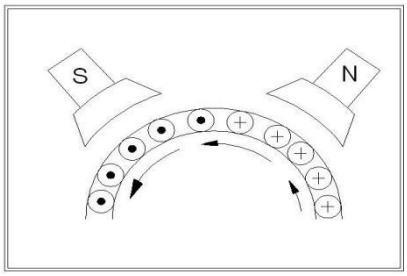
WORKING OF A DC MOTOR

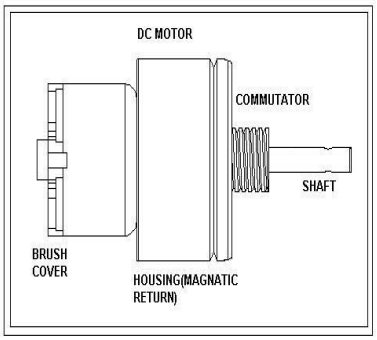
Consider a part of a multipolar dc motor as shown in fig. when the terminals of the motor are connected to an external source of dc supply;

i. The field magnets are excited developing alternate N and S poles.

ii. The armature conductors carry currents. All conductors under N-pole carry currents in one direction while all the conductors under S-pole carry currents in the opposite direction.

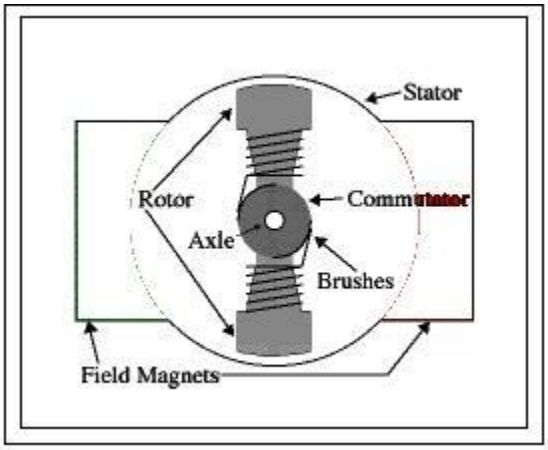
Suppose the conductors under N-pole carry currents into the plane of paper and those under S-pole carry current out of the plane of paper as shown in fig. Since each armature conductor is carrying current and is placed in the magnetic field, mechanical force acts on it. Applying Fleming's left hand rule, it is clear that force on each conductor is tending to rotate the armature in anticlockwise direction. All these forces add together to produce a driving torque which sets the armature rotating. When the conductor moves from one side of the brush to the other, current in the conductor is received and at the same time it comes under the influence of next pole which is of opposite polarity. Consequently the direction of force on the conductor remains same.





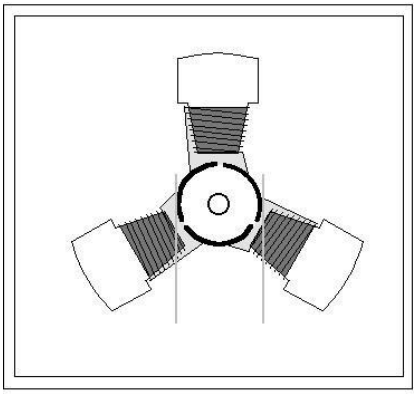
PRINCIPLES OF OPERATION

In any electric motor, operation is based on simple electromagnetism. A current-carrying conductor generates a magnetic field; when this is then placed in an external magnetic field, it will experience a force proportional to the current in the conductor, and to the strength of the external

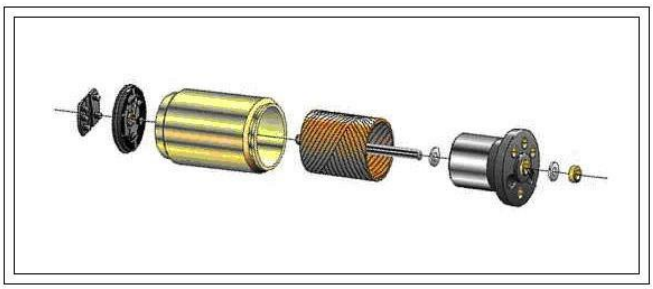


magnetic field. As you are well aware of from playing with magnets as a kid, opposite (North and South) polarities attract, while like polarities (North and North, South and South) repel. The internal configuration of a DC motor is designed to harness the magnetic interaction between a current-carrying conductor and an external magnetic field to generate rotational motion.

Every DC motor has six basic parts -- axle, rotor (armature), stator, commutator, field magnet(s), and brushes. In most common DC motors, the external magnetic field is produced by high-strength permanent magnets. The stator is the stationary part of the motor -- this includes the motor casing, as well as two or more permanent magnet pole pieces. The rotor (together with the axle and attached commutator) rotates with respect to the stator. The rotor consists of windings(generally on a core), the windings being electrically connected to the commutator. The above diagram shows a common motor layout -- with the rotor inside thestator (field) magnets.



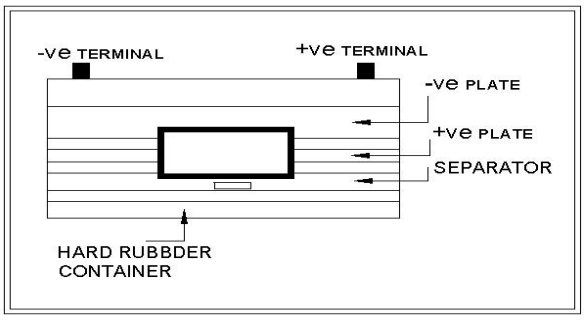
There's probably no better way to see how an average DC motor is put together, than by just opening one up. Unfortunately this is tedious work, as well as requiring the destruction of a perfectly good motor. The guts of a disassembled Mabuchi FF-030-PN motor (the same model that Solarbotics sells) are available for (on 10 lines / cm graph paper). This is a basic 3- pole DC motor, with 2 brushes and three commutator contacts.



The coreless design also allows manufacturers to build smaller motors; meanwhile,due to the lack of iron in their rotors, coreless motors are somewhat prone to overheating. As a result, this design is generally used just in small, low-power motors. Beamers will most often see coreless DC motors in the form of pager motors.

BATTERY

In our project we are using secondary type battery. It is rechargeable type. A battery is one or more electrochemical cells, which store chemical energy and make it available as electric current. There are two types of batteries, primary (disposable) and secondary (rechargeable), both of which convert chemical energy to electrical energy. Primary batteries can only be used once because they use up their chemicals in an irreversible reaction. Secondary batteries can be recharged because the chemical reactions they use are reversible; they are recharged by running a charging current through the battery, but in the opposite direction of the discharge current. Secondary, also called rechargeable batteries can be charged and discharged many times before wearing out. After wearing out some batteries can be recycled. Batteries have gained popularity as they became portable and useful for many purposes. The use of batteries has created many environmental concerns, such as toxic metal pollution. A battery is a device that converts chemical energy directly to electrical energy it consists of one or more voltaic cells. Each voltaic cell consists of two half cells connected in series by a conductive electrolyte. One half-cell is the positive electrode, and the other is the negative electrode. The electrodes do not touch each other but are electrically connected by the electrolyte which can be either solid or liquid. A battery can be simply modeled as a perfect voltage source which has its own resistance, the resulting voltage across the load depends on the ratio of the battery's internal resistance to the resistance of the load. When the battery is fresh, its internal resistance is low, so the voltage across the load is almost equal to that of the battery's internal voltage source. As the battery runs down and its internal resistance increases, the voltage drop across its internal resistance increases, so the voltage at its terminals decreases, and the battery's ability to deliver power to the load decreases.



3. CONCLUSIONS

The project carried out by us made an impressing task in the field of automobile department. It is very useful, because they need not take any risk for park the vehicle in apartment building. This project will reduce the cost involved in the concern. Project has been designed to perform the entire requirement task at the shortest time available.

ACKNOWLEDGEMENT

The aim of our project is to parking the vehicle with ease by 90 degree steering control. So here we are using the servo motors to park the vehicle. This system is very useful for parking the vehicle.

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