Multi-Joint Robot

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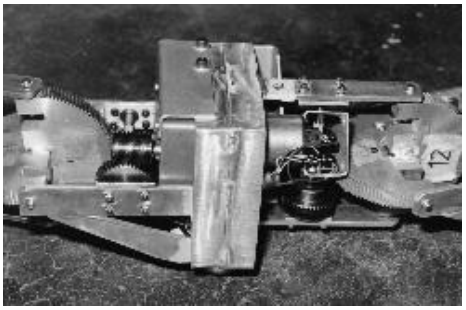
Currently robots and mechatronic equipment are widely used in various of manufacturing systems as well as some application in aerospace. The Center of operation for field robotics development (FIBO) at King Mongkut's Institute of Technology Thonburi (KMITT) has designed and built a robot that has many degrees of freedom i.e. Multi-joint (Snake-like) robot. This redundant robot is a kind of robots that possesses more degrees of freedom (DOF). There DOF are required to position and orient the end effector such that it has ability to avoid some obstacles and traverse on levitated planes. Presently, an inverse kinematics for obstacle avoidance problems can be solved in many ways such as (i) potential function method (ii) reference configuration. These methods solve problems by use differential inverse kinematics. We propose to ore different inverse kinematics since it is simple but effective enouh for our application. The attached figures show our snake robot being built at FIBO.

This project focuses on the solving of obstacle avoidance by using commanded path given by an operator. We can find joint angles of the robot that are always fixed in specified path. In each sampling time the moving of end effector depend on velocity commands and commanded path. Therefore we know their differences and then the angular velocity of each joint can be solved by those data. The body of this robot is designed to have 16 joints for avoiding the obstacles and traverse in different planes. Each of them can move up-down and left-right. At the base of the robot, it is connected with a SCARA type robot that provides a driving force to the robot. We have demonstrated numerical examples and the example of commanded path will be demonstrated in this research by using computer simulation.



The mechanism of a link of Snake robot

View of our Snake robot

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