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Mobile Robot for Inspection of Power Transmission Lines

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Some theoretical and experimental studies have been developed to obtain independent equipment for inspection and maintenance of electric and communication lines, allowing to increase the efficiency of the process and to reduce the risk of accidents with the employees who execute the task. This activity is perfectly adequate for mobile robots because they are capable to move in avoiding the existing obstacles on the cables. The more important mechanical characteristic of the mobile robots is related with its stability, that are in two types: the static stability that is its capacity to maintain a configuration from reaction forces; and the dynamic stability that is its capacity to maintain a configuration from reaction forces and inertia forces. Then the stability of mobile robots with legs is function of its movement and legs number. For example, for a robot with two legs, it is necessary to consider its dynamic behavior to keep its stability during the movement. For the static equilibrium are required three legs, at least, allowing that the resultant reaction with the ground equilibrate the weight of the robot. Although be required three legs at least for the static equilibrium, is usual to use four or six legs. Using more than 3 legs the robot equilibrium is kept during motion: always are three legs in contact with the ground during the swing phase of one leg [1]. In this work have been made the kinematic analysis and the project of a robot with four legs to motion suspended by wire. The mobile robot is composed by two pairs of identical legs, operated by one direct-current motor. Each leg consists of a slider-crank mechanism where the foot is situated in the extremity of the slider [2]. The two pairs of legs are connected by a timing belt, having a synchronized movement. Each leg of a pair is assembled in phase of 180 degrees. The kinematics analysis have been developed to a pair of legs and after for the whole mechanism. The simulation of the mobile robot suspended for wire have been developed by using the softwares MicroStation 95[®] and Matlab[®].

REFERENCES

- [1] Angeles, J., **Fundamentals of Robotic Mechanical Systems**, (1997).
- [2] Gonçalves, R.S., Carvalho, J.C.M., **Mobile Robot Suspended by Wire**, *Final report of Scientific Initiation*, PIBIC/CNPq, Uberlândia, (2002). (in Portuguese)