

PARAMIS parallel robot for laparoscopic surgery

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Abstract

The paper presents the parallel robot, which has been developed in Romania and it is used for laparoscope camera positioning. Based on its mathematical modeling, the first low-cost experimental model of the PARAMIS surgical robot has been built. The system has been built in such a way that it has the possibility to transform it in a multiarm robot controlled from the console. The control input allows the user to give commands in a large area for the positioning of the laparoscope using different interfaces: joystick, microphone, keyboard & mouse and haptic device. The first results have been obtained through the performing of an experimental laparoscopic cholecystectomy using PARAMIS surgical robot. The model which was used was a porcine liver, removed with the gall-bladder and the bile ducts. Due to its very easy use control system, surgeons have adapted rapidly to the use of PARAMIS in surgical procedures. Some of its advantages could be emphasized: precision of the movements; absence of the laparoscope operator's natural tremor, direct control over a smooth, precise, stable view of the internal surgical field for the surgeon; no fatigue; allows the use of both hands for the actual procedure; reduces eye fatigue; eliminates the need for a second surgeon to be present for the entire procedure.

Key words: robotic surgery, parallel robot, control system, simulation, interface, cholecystectomy

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