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Trajectory planning for smooth motion of a surgical robot

Lee Jer Vui¹, Zahari Taha¹, Yap Hwa Jen¹, Iskandar¹, Mohamed Razif Mohamed Ali²

¹Centre of Product Design & Manufacturing, Department of Engineering Design & Manufacture, Faculty of Engineering, University of Malaya, 50603, Kuala Lumpur, Malaysia.

²Department of Orthopaedic Surgery, Faculty of Medicine, University of Malaya, 50603, Kuala Lumpur, Malaysia.

E-mail: lee_jer@perdana.um.edu.my

This paper describes the development of a robot surgical system and how to obtain a smooth path for the robot trajectory. In the developed system, a surgeon can interact with his/her virtual environment via a developed virtual reality (VR) system. The data of the surgical operation is recorded, filtered and fitted with polynomials before loaded into the simulator. Eventually, the successful simulation of an operation will be converted into robot command for real robot operation by a developed post-processor that is currently being developed. In order to obtain a smooth path for the robot, data was fitted with polynomials ranging from the 5th to 9th degree. The velocities and accelerations were calculated using the central difference method. It is found that 9th degree is always more accurate than 5th degree polynomial regression.