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Robotic And Control Issues In Large Antennas

Large antennas is a typical electronic equipment for radio radiation. Robotic and automatic control systems are often used to improve the performance of antenna. This talk deals with the configuration/parameter design of robotic manipulator for feed positioning or main reflector pointing, and secondary reflector fine tuning. Some novel concept are proposed in these application of robots. For example, light-weight design of antenna robotic pedestal thoroughly change the conventional configuration of a antenna, and thus cut down the construction cost. Another example including as being independent of the magnitude of reference input signal, the conventional concept of servo bandwidth stemming from electronics fails to reflect the ability of the multiple degree-of-freedom (DOF) mechatronic system to perform vibration control. Considering the magnitude and frequency of reference input signal, a novel definition of mechatronic servo bandwidth of the Stewart platform-based active vibration isolator for a super antenna is proposed. Then its mechatronic servo bandwidth is theoretically evaluated according to electrical and mechanical performances by using an optimization method. From the application point of view, the mechatronic servo bandwidth can be employed to measure the manipulating rapidity of a multiple DOF mechatronic system and the range of vibrations that an isolator is able to overcome.