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WIRELESS TRANSFER OF ENERGY AND INFORMATION. SHAPE CONTROL OF LARGE STRUCTURES

Abstract

This research work objective is development of the system capable of controlling reflector pattern shape. Ensuring correction of the frontal radio-reflection antenna net geometry in its specific points with the help of actuating devices through changing the cables length. Actuators being supplied with energy and information in wireless manner. Coordinates of the adjustable position points are rather accurately defined by the tacheometer according to the specific reflective markers. System controlled by electronic computer machine (ECM), that contains information on the required net-curtain shape, which allows calculating difference between the required and established position at each pulled-in points. The corresponding computation having been performed, the ECM forms the indexed data set containing the required direction and length of movement for each adjustable point. Hereafter, frontal net points demonstrating over-limit deviation from the required shape are selected and counted followed by positioning of the exciting laser on the surface photo cell of the corresponding actuating device, thus executing power supply. To transfer information on the required direction and length of movement, it is supposed to use the exciting laser beam modulation ensured by connecting one of the information inputs of the actuating device' controller to the photo cell. Thus, laser pulses can be read by microcontroller and converted into the sequence of data bits to be used for developing the control signal for the actuator' adjustment. The set objective solution has resulted in working out the cyclic graph of system operation, functioning algorithm of subsystems for shape measurement and for energy and information transfer, as well as in the outcome of testing thereof in the breadboard and experimental models