A systematic methodology for analyzing the deployment process of a hoop truss deployable antenna is presented. The specific structure of truss node element is considered exactly, especially the influence of parameters of pulleys on the deployment process of the system. Based on the kinematic relation between each node and deployment angle and a numerical method for solving the common tangent of two space pulleys, a accurate method for calculating the length of the rope in the system during the deployment process is proposed. And also the relation between the driving speed of the motor and the deployment angular velocity of the system is obtained, so that the deployment speed of the system can be controlled according to the design of the driving speed of the motor. Numerical examples prove the validity of the method applied in a general rope\|pulley system.

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周边桁架式可展开天线展开分析与控制

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Analysis and Control of Deployment Process for Hoop Truss Deployable Antenna

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