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A SEMI-SUPERVISED LEARNING BASED SPACE DEBRIS DETERMINATION USING ONLY PUBLICALLY AVAILABLE TWO-LINE ELEMENT SETS

Abstract

Orbit determination is the process to estimate the position and velocity (the state vector, state or ephemeris) of an orbiting object. Any space debris in its orbit faces many forces that affect its position in its orbit and therefore affect the tracking system. This leads to search for a method to correct these drifts. The nonlinear problem of tracking and predicting where a space debris will be over some time is one of orbit determination early challenges. Machine Learning is the study of computer algorithms that improve automatically through experience. Semi-supervised learning is one of the most important machine learning method. By using Semi-supervised learning, this paper models the drifts and embed the model in SGP4/SDP4 model to get more accurate orbital estimation. Experimental results shows this approach performs well.