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Author: Dr. xu binghua

National Key Laboratory of Aerospace Flight Dynamics, Northwestern Polytechnical
University, Xi'an, China, China, xubinghua1984@sohu.com

Prof. Zhanxia Zhu

National Key Laboratory of Aerospace Flight Dynamics, Northwestern Polytechnical University, Xi'an,
China, zhuzhanxia@nwpu.edu.cn

Mr. Hongwen Zhang

National Key Laboratory of Aerospace Flight Dynamics, Northwestern Polytechnical University, Xi'an,
China, 18702951499@163.com

Mr. ZhaoFei ZHANG

CASC, China, 348830139@qq.com

RESEARCH ON COMPENSATION FOR SCALE FACTOR OF RATE BIASED RLG POSITION AND
ORIENTATION SYSTEM

Abstract

Scale factor of Rate Biased RLG can not keep constant because of RLG internal cavity temperature variety and lock zone instability etc. We analyzed the scale factor error for Rate Biased RLG Position and Orientation System, and found that the scale factor and asymmetry of scale factor under the mode of the rate bias can be increased by an order of magnitude compared with the mechanical dithered mode. This would bring the north seeking accuracy down. Thus, in order to decrease the scale factor influence on north seeking accuracy, we proposed a scaling factor real time compensation algorithm, in which we use the difference between navigation tracking angle and angular information of indexing mechanism to compensation scale factor, and minimize the seeking north results error caused by scale factor change under the practical usage case of outside shaking interference once power on and repeatedly power on Rate Biased RLG Position and Orientation System. This compensation algorithm is easy to carry out. We test it by using this algorithm to Rate Biased RLG Position and Orientation System with machine dither mode of 0.009 deg/h RLG, In various of environment requirements, the experiment results show that 5mins north seeking precision can reach 40", increased 4 times compared with machine dither mode.