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Analisis performansi open loop fiber optic gyroscope sumbu tunggal berdasarkan angular random walk = Single axis open loop fiber optic gyroscope performance analysis based on angle random walk

Dewi Anggraeni, author

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Abstrak

Fiber Optic Gyroscope adalah sensor optik yang dapat menentukan posisi sudut gerak sebuah benda. FOG bekerja bedasarkan efek Sagnac, yang menyatakan bahwa pergeseran fase antara dua gelombang berlawanan merambat dalam interferometri cincin berputar, sebanding dengan putaran kecepatan sudut. Salah satu indikator performansi sistem pengukuran yang baik adalah memiliki noise yang kecil. Angle Random Walk adalah kontribusi noise terbesar pada nilai error. Dalam penelitian ini telah dilakukan estimasi noise dari ARW. Performansi OFOG berdasarkan ARW telah dijelaskan pada simulasi ARW berdasarkan emisi foton dan jumlah data cuplik per waktu. Pengaruh ARW terhadap performasi dijelaskan pada grafik PDF. Teknik mereduksi eror dari nilai ARW juga telah dipaparkan untuk meningkatkan performansi OFOG. Telah dibangun protipe OFOG, eksperimen non noise dan analisis koreksi data output melaui simulasi, dimana data output hasil eksperimen hampir sama dengan simulasi koreksi di L = 1,5 km. Nilai ideal rentang pengukuran prototipe OFOG pada 0-5,5 ?/detik, dan nilai ARW di 4,56 x 10-2 ?/ radic;detik.
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Fiber Optic Gyroscope is an optical sensor that can determine the position of the angle of motion of an object. FOG works based on the Sagnac effect, which states that the phase shift between two opposite waves propagates in the interferometry of the rotating ring, and proportional to the angular velocity. Goodness performance indicator of measurement system, is having a small noise. Angle Random Walk is the biggest noise contribution to the error value. In this research, noise estimation from ARW has been done. OFOG performance based on ARW has been described in the ARW simulation based on photon emission and the amount of data sampling per time. The effect of ARW on performance is explained on the PDF graph. Error reduction techniques from ARW values have also been presented to improve OFOG performance. Has developed OFOG prototype, non noise experiments and output data correction analysis through simulation, where the experimental output data is almost the same as the correction simulation at L 1.5 km. The ideal value of the OFOG prototype measurement range at 0 5.5 sec, and the ARW value at 4.56 x 10 2 radic sec.