

Sensor Failure Detection in Selftesting Navigation System

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Abstract

The reliability and security become more important as the complexity of both computational and procedural increases. Diagnostics of industrial processes deals with the recognition of changes in the states of these processes, where industrial processes are understood as a series of intentional actions carried out within a fixed period of time by a specific set of machines and devices at the available resources. Diagnosis is treated as a process of detecting and distinguishing damage to an object as a result of collection, processing, analysis and evaluation of diagnostic signals. Diagnosis can be carried out with varying degrees of detail. Depending on the type of object and the knowledge about it, the result of the diagnosis may be a detailed identification of the damage or only a general description of the status class.

The work focuses on navigational systems, determination of positive as well as negative sides of existing solutions and a solution was proposed combining three systems: satellite, inertial and barometric. The combination of functionality is carried out using the extended Kalman filter and the neural self-testing block. The fact of using the neural self test block allows for effective determination of position in space and detection of irregularities.

References

1. MARTIN LIGGINS II AND DAVID HALL AND JAMES LLINAS. Handbook of Multisensor Data Fusion: Theory and Practice. CRC Press 2008.
2. KRZYSZTOF KOLANOWSKI AND ALEKSANDRA ŚWIETLICKA AND RAFAŁ KAPELA AND JANUSZ POCHMARA AND ANDRZEJ RYBARCZYK. Multisensor data fusion using Elman neural networks. Applied Mathematics and Computation 319 (2018) 236–244.
3. GLOBAL POSITIONING SYSTEMS AND INERTIAL NAVIGATION AND AND INTEGRATION. Mohinder S. Grewal, Lawrence R. Weill, Angus P. Andrews. WILEY 2007.