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Towards Implementation of Reconfigurable Robotic Strategies for Structural Health Monitoring

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Previous research at The University of Strathclyde has led to the development of small robotic NDE vehicles. These wireless, semi-autonomous platforms are capable of deploying a variety of conventional NDE payloads (ultrasonic, eddy current etc) on a sample. The ability of multiple vehicles to reconfigure their distribution in ultrasonic pitch/catch arrangements has been implemented. We propose now to use the vehicles to form a reconfigurable SHM system. For structural excitation, a transmitter robot will carry a miniature actuator such that the source position can be continuously varied over the sample. In the first instance we will investigate the optimisation of source position, using a fixed receiver network to monitor the vibrations in the structure. The concept will be extended to explore both mobile transmitter and receiver combinations. In common with the NDE applications, the estimate of robot position is critical to the success of the approach. Currently both absolute (acoustic GPS) and relative positional measurements are combined using a probabilistic approach and an accuracy of around 10mm is obtained.

Ключевые слова:

Содержание.

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