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<b>Effect of Fiber Volume Fraction on Monitoring Delamination of CFRP Laminates with Electric Resistance Change Method</b> M. Ueda, A. Todoroki and Y. Shimamura	1935
<b>Application of Localized Flexibility Method to Damage Detection of CFRP Space Frame</b> Y. Aoki, G. Ben and T. Yamada	1943
<b>Acoustic Emission during Fracture Process of Rubber-Modified Epoxy Resin</b> D.B. Lee and N.S. Choi	1951
<b>Measurement of Moisture Absorption Ratio of FRP Using Micro Polymer Sensor</b> Y. Shimamura, T. Urabe, A. Todoroki and H. Kobayashi	1957
<b>Cure Monitoring and Microfailure Sensing of Single-Fiber Reinforced Cement Composite by Measurement of Contact Resistance and Acoustic Emission</b> S.I. Lee, D.J. Yoon and J.M. Park	1965
<b>Detection of Crack Source Location on RC Structures Strengthened with CFRP Plate for Health Monitoring System</b> J.Y. Park, H.D. Cho, S.H. Han and M.Y. Choi	1971
<b>Critical Threshold Value for Monitoring &amp; Management of Cable Tension Force in Cable-Stayed Bridge</b> H.N. Cho, Y.M. Choi, S.C. Lee, K.K. Kang and M.Y. Choi	1977
<b>Health Monitoring Method Using Committee of Neural Networks</b> J.W. Lee, J.H. Yi, J.D. Kim and C.B. Yun	1983
<b>Running Safety Estimation of Korean Style High Speed Railway Vehicle</b> Y.S. Ham, J.S. Hong and T.Y. Oh	1989
<b>Wireless Instrumentation System for Measuring the Dynamic Characteristics of a Beam</b> C.Y. Kim, I.B. Kwon, H.S. Kwon, M.Y. Choi and S.S. Lee	1995
<b>Plastic Collapse Evaluation on the Notched Stainless Steel Piping Subjected to Combined Tension and Bending by Photo-Elastic Coating</b> S. Izawa, M. Matsubara, K. Nezu and K. Sakamoto	2001
<b>On-Line Monitoring of Cable Defects by RF Detection</b> S.H. Lee, W.H. Lee, H.D. Jeong and C.H. Lee	2006
<b>An Analysis of the Characteristics of SPG Bridges Using NExT and ERA for Real-Time Monitoring</b> G.H. Heo, G. Lee, D.G. Lee, C.O. Lee and M.G. Kim	2012
<b>A Faster Wavelet Analysis Algorithm Based on DSP/BIOS</b> X.F. Zhang, K.R. Shi and L.N. Zheng	2018
<b>Design Strategies for Phased Array Ultrasound Systems in Nondestructive Testing</b> X.G. Xu, K.R. Shi and Y.F. Chen	2024
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<b>Nondestructive Evaluation of the Mechanical Behaviors of the Human Femoral Head with Osteonecrosis</b> C.J. Byun and S.H. Yoo	2073
<b>Evaluation of Human Bone Elastic Stiffness by Resonant Ultrasound Spectroscopy and Micro Finite Element Method</b> S.H. Yoo, W. Kim, J.H. Moon and S.S. Lee	2079
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