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Welding Quality Evaluation Using Residual – Based Reference Temperature Distribution Model and Fuzzy Reasoning

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Abstract: A method for welding quality evaluation, which combines model identification and fuzzy sets methods, is proposed. To account for welding quality variations, the proposed approach is based on an optimal reference Gauss distribution temperature along of the welding line in order to take into account the eventual process changes. Fuzzy analysis is then applied to the generated residual data to give an evaluation of the welding condition. This approach is applied to welding process for constructing a complementary condition monitoring system which permits an online quality evaluation. The temperature measurement is carried out using an infrared camera. Simulation results based on the measured surface temperature and generated residual data show that the new approach is easily implementable and gives good evaluation online.

Keywords : Heat Affected zone of Welding Process, Infrared temperature measurement, Gauss distribution model, Residual generation, intelligent modeling, Fuzzy reasoning, Quality evaluation.