

Delta domain emulator-based adaptive MPC for an MCFC system

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A delta domain emulator-based adaptive model predictive control (AMPC) technique has been proposed for stack temperature control of a molten carbonate fuel cell (MCFC) system. The MCFC system is unique in that the system should be kept as stable as possible to avoid potential electrode damage, which renders the identification experiment difficult. Moreover the MCFC system has nonlinearity according to the load due to many reactions and stack structure. Although the temperature changes vary slowly, the system has to be monitored by relatively short sampling time for safety problem. To accommodate such characteristics, an MCFC simulator was developed and delta domain emulator-based adaptive MPC was devised and applied to the numerical MCFC system. The performance of the proposed technique was investigated numerically.