Abstract

Motion control and robust path tracking were extended to non-square MIMO systems having more outputs than inputs in this work. The Non-square Relative Gain array (NRG) has been used to assess the performance of non-square control systems based on steady-state information. Using NRG and the SSE (Sum of Square Error), a square subsystem can be selected. MIMO-QFT (Quantitative Feedback Theory) robust synthesis methodology permits to generate the appropriate equivalent MISO (Multi-input Single-Output) system structure from the MIMO (Multi-Input Multi-Output) structure. After that, the CRONE control approach based on third generation CRONE methodology was used to find the controller of the selected subsystem taking into account plant uncertainties. A fractional prefilter synthesis approach was already developed to find a non-integer prefilter expression in order to satisfy the performance specifications. A fully populated matrix controller structure has been proposed to govern
perfectly the multivariable processes. In order to reduce the loop interactions, a coupling matrix has been designed. A numerical example has been treated in order to verify the proposed design.

References

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Index Terms

Computer Science  Control Systems

Keywords

Path Tracking  Non Square Relative Gain Array (nrg)  Crone Control Design  Motion Control  Coupling Effect  Robotics
Design of centralized CRONE controller combined with MIMO-QFT approach applied to non square multivariable systems