A new method for designing PID Controllers using Bode’s ideal transfer function and constrained Particle Swarm Optimization (PSO) is proposed in this paper. Bode’s ideal transfer function is introduced using fractional calculus and Carlsson’s approximation is used for converting the transfer function from fractional to integer domain. The PID controller is designed by minimizing a hybrid objective function using PSO. Simulation examples confirming the effectiveness of the resulting controller are also discussed in detail and a performance comparison, highlighting the enhanced capability of PSO over other conventional mathematical optimization approaches, is also made in the paper.

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Index Terms

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PID  Bode's ideal transfer function  PSO  Active Set optimization  Fractional Order Controllers