

## Stability Analysis of Fractional Order Systems with Time Delay

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**Abstract :** In this paper, we mainly study the stability of linear and interval linear fractional systems with time delay. By applying the characteristic equations, a necessary and sufficient stability condition is obtained firstly, and then some sufficient conditions are deserved. In addition, according to the equivalent relationship of fractional order systems with order  $0 < \alpha \leq 1$  and with order  $1 \leq \beta < 2$ , one may get more relevant theorems. Finally, two examples are provided to demonstrate the effectiveness of our results.

**Keywords :** Fractional order systems; Time delay; Characteristic equation

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