Résolution de l'Equation d'Etat d'Ordre Fractionnaire

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Abstract : Fractional order systems are linear dynamical systems represented by linear fractional order differential equations given as: D^{a}=Ax+Bu pour 0 < alpha < 1Therefore, the goal of this work is to present a resolution method of this type of fractional order state equation in order to facilitate its study, analysis and synthesis. The work realized and the results obtained for the resolution of this differential equation are based on Charef's approximation method of irrational functions and the Cayley Hamilton's technique for the resolution of regular linear differential equations. The impulse and the step responses of this type of systems have been derived. Illustrative exemples have been presented to test the resolution approach. A comparison with another method based on the so-called function of Mittag-Leffler has also been made to show the effectiveness of our resolution technique of the linear fractional order differential equation.

Keywords : Fractional order systems, Cayley Hamilton's technique, Functions of matrices, State space representation