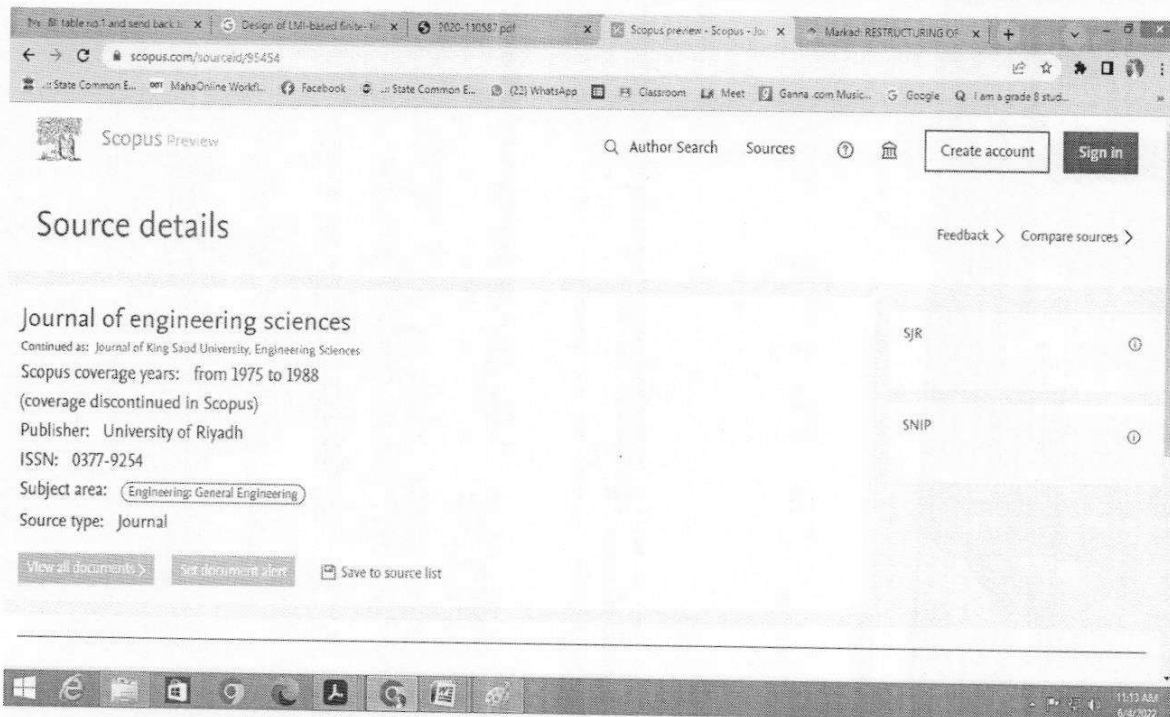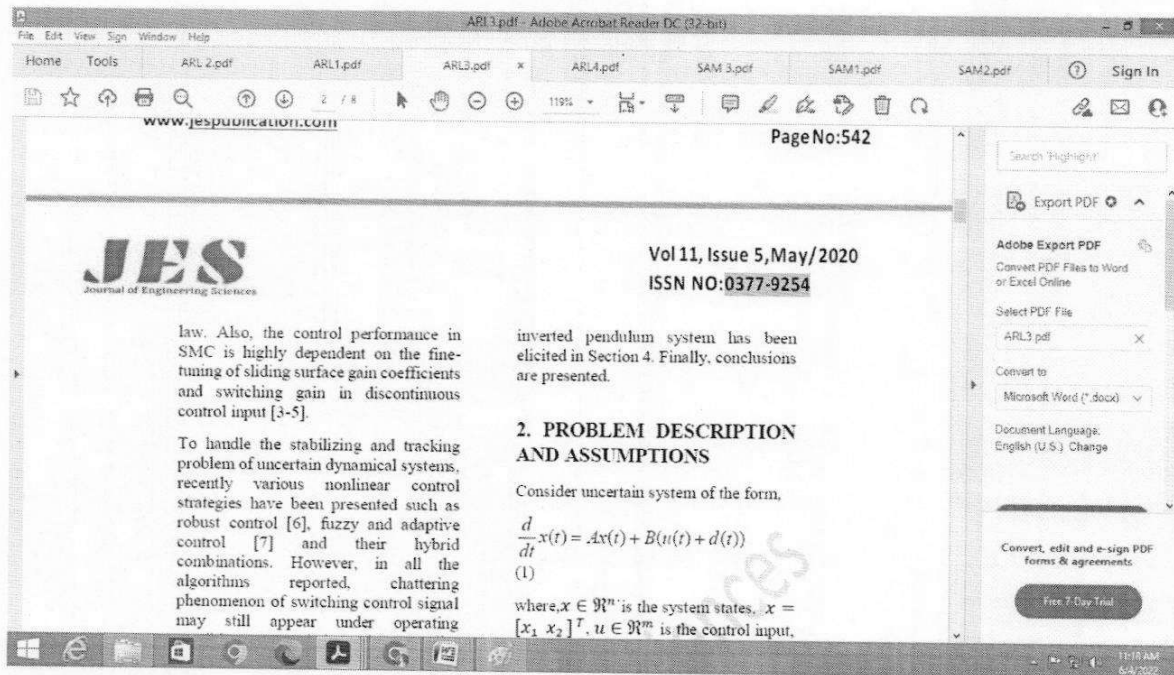**Design of LMI-based finite- time sliding mode controller: The convex optimization problem .**

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law. Also, the control performance in SMC is highly dependent on the fine-tuning of sliding surface gain coefficients and switching gain in discontinuous control input [3-5].

To handle the stabilizing and tracking problem of uncertain dynamical systems, recently various nonlinear control strategies have been presented such as robust control [6], fuzzy and adaptive control [7] and their hybrid combinations. However, in all the algorithms reported, chattering phenomenon of switching control signal may still appear under operating

inverted pendulum system has been elicited in Section 4. Finally, conclusions are presented.

2. PROBLEM DESCRIPTION AND ASSUMPTIONS

Consider uncertain system of the form,

$$\frac{d}{dt}x(t) = Ax(t) + B(u(t) + d(t))$$

(1)

where, $x \in \Re^n$ is the system states, $x = [x_1 \ x_2]^T$, $u \in \Re^m$ is the control input,

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