**ABSTRACT**

In this paper, the non-fragile observer-based passive control problem is discussed for a class of systems with repeated scalar non-linearities and time-varying delays. The non-linear system is defined by a discrete-time state equation containing a repeated scalar non-linearity. The system under consideration is modelled by assuming the random imperfect communication links existing between the controller and observer. The random fluctuations are defined by utilizing the Bernoulli distributed white sequences. The non-fragile observer-based feedback controller gains are designed to guarantee that the considered closed-loop control system with repeated scalar non-linearities and time-varying delays is passive. Sufficient conditions are derived for the existence of controller and observer gains by using the Lyapunov stability theory, passivity theory and linear matrix inequalities. As a final point, a numerical example by using a marketing-production system is presented to demonstrate the effectiveness of the proposed theoretical results.