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DESIGN OF ADVANCED PSEUDO RANDOM DISCRETE TIME EVEN SYSTEM FOR FAULT DETECTION

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Abstract: **In this paper, the design of advanced pseudo random discrete time even system for fault detection is implemented to increase the speed of the system. Here sufficient conditions are given to implement the estimator. Pseudo random multiple input signals are given to DES. The main intent of this pseudo random discrete time even system is to increase the speed and produce efficient result in terms of delay and area. The discrete time even system will take multiple signals and perform its operation. The adaptive MISO (multiple input and single output) controller will controls the speed of the system. Self-tuning regulator will tune the multiple inputs and give the single output. Hence, from pseudo random single output block, the output is obtained. Compared to the existed system, the pseudo random discrete time even system gives effective output.**

Key Words: **MISO (Multiple input ingle output), Discrete time even system (DES), pseudo random discrete time even system (PR-DES).**

I. INTRODUCTION

The fault diagnosis is the feature of complex DES (Discrete Event Systems) in every manufacturing systems and reliable control systems coordinating large. Hazardous situations and unnecessary risks to humans within system are eliminated during the operation of DES and it maintains the production rate [1]. There are different method and approaches to address the location in DES. Fault detection problem depends upon discrete event models and techniques of artificial intelligence. For modeling formalism, finite automata (FA) and Petri nuts (PN) are used in last approaches. There are many proposals, their worked on addressing of fault diagnosis depends upon FA models. Among these the concept of diagnos ability of DES is used to develop the diagnosis procedure.

The designing of diagnose is introduced in that works: for online diagnosis, from DES model deterministic FA is derived. Even though introduced techniques are efficient but these are applicable to small size systems. In these techniques, if the size of system increases then FA models to be large models. There are number of works on DES diagnoses that uses PN, to handle the drawbacks of FA representation [2]. The features of this work are exhibiting concurrency, clearer graphical descriptions of DES and sound mathematical support. By using PN online fault detection technique was introduced and this technique depends upon monitoring of the number of tokens residing into P-semi flows.

To introduce the redundancy into the systems, PN model is used by C. N. Hadjicostis [6]. Settlement of additional new P-semi flows was done in this work. Due to this detects and faulty markings are isolated. Based on PN models, a method is introduced by S. Genc they performed analysis of fundamental FA. Reach ability graph is exhausted, this paper also based on PN models and interpreted PN (IPN) are used for modeling both, faulty behavior of the system and normal. Structural characterization of diagnosability is the previous result. Hence a new technique, to monitoring DES behavior IPN models are reduced and it is a simple technique. There is no longer need of DES model synchronization and partial information on marking is only used in this technique. We demonstrate the presence of monitoring model that depends upon the diagnosability property of the system model. To design the monitoring model new methodology is provided.

Diagnosability problem is introduced for the context of failure diagnosis problem. Failure detection and isolation are the important work in automatic controlling of large complex systems [3]. For accurate and timely diagnosis of system failures, it is necessary to design the systematic and sophisticated methods depend on reliability and performance of manmade systems. It receiving the failure diagnosis problem and it is considerable a wide variety of schemes and attention in literature was introduced. It includes:

1) Based on mathematic models, quantitative methods
2) Other expert systems and AI-based methods and
3) DES's (discrete-event systems) methods.

Analytical model of the physical process is employed by the quantitative methods is to allows for comparison of sensor measurements with their predicted values. By the knowledge of reasoning mechanisms and human experts the diagnostic systems to be produced based on the AI.

II. RELATED WORK

The several researchers investigate the Partial observation problems in discrete event systems (DES's) [4]. It is not possible to detail study the problem of diagnosability itself. The subject in several papers, is understanding of observability with delay, invert ability and observability. Diagnosability is the other problem for the reasons: by failure events partitioning, better results are occurred like failure type identification. There is a chance to occur multiple failures and existence of unobservable events. During diagnosis or normal operation, there is no need of detection or absence of locking- on technique.

In recent literature, the introduced topic is diagnosability and other approaches are discussed. The difference is noticed between diagnosability and other notations, after that i) Lin, shows the diagnosability in different approaches, state-based technique is introduced for diagnosability. His assumption is partial state information provides output function. Online and offline diagnosis are separate and it is addressed by the system. If the system is to be diagnosed the normal operation can't be performed [5]. Observation of resulting outputs and sequence of test commands providing and drawing inference on set of possible states ate the steps in system diagnostic. The problem of off line diagnosis is equal to the verification problem. In the online diagnosis, the issuing of sequence of commands is the main aim if the system is in normal operation.

On the other hand in the off-line diagnosis, check the uncontrollable events during the diagnostic process. For the processing of diagnostic control or sequence of test commands, an algorithm given by author if the failure occurred in diagnostic system. The above work is extended by Bavishi and Chong, DES"s testability is considered in this work.

A) To identify the set of sensors, testability is provided in given system.
B) By using fixed set of sensors, determination of informal partition of state space system to be done.

The supervisory problem of the control with partial event observations and introduce a language-based definition of state and observability conditions for the existence of a solution to the supervisory control problem. These are in terms of observability and controllability of languages. There is no need of system state identification or unobservable occurrence determination when addressing of control problems and introduced the obsevability notation and it is different from problem of diagnosability. Observabilities of state machines: DES's obervability is presented [6].

By using Ramadge explicitly, for the discrete event systems the state identification problem is addressed. By using partial state observability, the system is designed through the output map. The problem is reconstructed in the exact state if every event occurred system and address the motivation for observability problem. To control synthesis and observer- state feedback technique is presented. In this different framework to be studied and it does not compare to diagnosability problem. Different observability notation approved and their assumption is partial event observation without direct state observations [7]. There is a chance to current state determination at intermittent by using observable event records and separated by bounded number of events.

DES is represented as observer, state of the system estimations are provided by it after observable event occurrence. The observability problem with states and delay is addressed at the intermittent points the system to be observable. The diagnosability is same as event detection problem in our frameworks, when problem of state identification is observed then stronger notation in diagnosability. For the particular state or set of states, notations are not observable and at least one state will be earlier introduced which is identifiable at intermittent points [8]. Failure states to be identified with delay is required in diagnosability.

Same requirements are not needed in normal states of system and arbitrary long sequence of events is executed because it is in normal operation. From the above we can say that the system to be still diagnosable by taking observation of failure of some of the systems observation if it is in the post-failure operation. No states are presented those are uniquely identifiable.

On the other hand the difference between diagnosability with delay and observability is explained. A. Hence unique identification is required not only for every failure state but also for every set of the partition. The system is designed as input-output state automation with partial state information studied through the output function and taken these output automation state into a special case where the input set is singleton. By using input-output automation state, current state observability and initial state observability are addressed by two kinds of observers those are classical observers and logic based dynamical observers [9]. The classical dynamic observer is defined as finite state automation; it takes for its inputs observed system behavior such as sequence of input-output pairs and sequence of state estimations are generated.

In the frameworks of predicate calculus, logic based dynamical system is designed. To generate the sequence of logic propositions, the observer explains the properties of system and adaptability is the feature for the system model changes. The observability is studied and the discussed observability is different in some characteristics. The determination of current state of system is assumed by authors. It is known for all future time [10], i.e., once the observer estimate converges to the true state of the system. Then it will stay locked on and will always provide the correct system state as its output, for all observed input-output behavior.

III. FAULT DETECTION AND ISOLATION

In system we consider the special form with same output equation, in the model of linear system take the account for actuator failure

$x(k + 1) = Ax(k) + Bu(k) + Bv(k)$ (1)

Different soft and hard actuator failures are easily designed by last term and it is noticed that by assuming no failure takes place during estimator's transient, actuator failures can be detected. At time k+1 and k use the estimate of the state to find estimate of v at time k, let us assume B is in full rang and it is represented as

$\hat{v}(k) = (B^{\tau}B)^{-1}B^{\tau}[\hat{x}(k + 1) – A\hat{x}(k) - Bu(k)]$ (2)

Vector 8 is monitoring. The shape of failures are identified and detected, all components of 9 bust be zero or closed to it in normal operation. Consider the effect of sensor failures by considering following system description, the signals corresponding to actuator failure when any component of 8 becomes non zero

$X(k+1) = Ax(k) + Bu(k)$ (3)

$Y(k) = Cx(k) + Kf(k)$ (4)

Here f describes the unknown vector of sensor failures and it can shown as

$f(k +1) = A_f f(k) + \eta(k)$ (5)

Here q means unknown and A contains Eigen values inside the unit circle.

IV. PSEUDO RANDOM DISCRETE TIME EVEN SYSTEM

The below figure (1) shows the block diagram of pseudo random discrete time even system. In this pseudo Random multiple signals, Discrete time even system, adaptive MISO controller, self tuning regulator and pseudo random single output.

The main intent of this pseudo random discrete time even system is to increase the speed and produce efficient result in terms of delay and area. The pseudo random multiple signals will give multiple input signals to the discrete time even system. The discrete time even system will take multiple signals and perform its operation. The adaptive MISO (multiple input and single output) controller will controls the speed of the system. Self-tuning regulator will tune the multiple inputs and give the single output. Hence, from pseudo random single output block, the output is obtained.

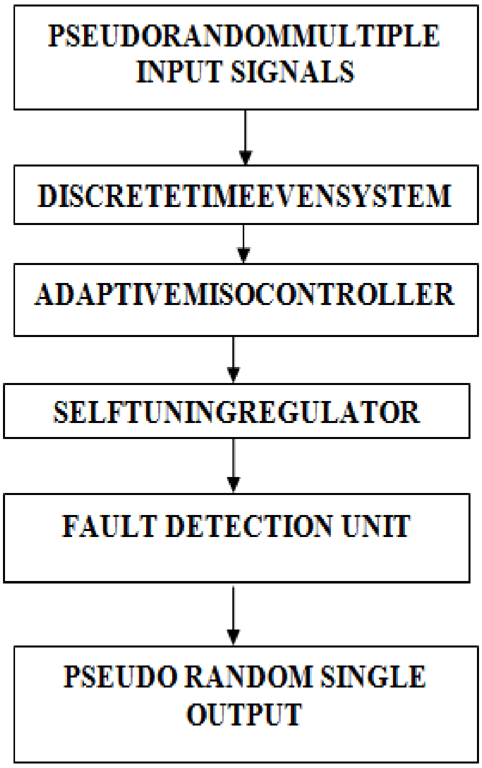

Fig. 1: PSEUDO RANDOM DISCRETE TIME EVEN SYSTEM

Sequences, which are generated by deterministic algorithms so as to simulate truly random sequences are said to be pseudorandom (PR). A pseudorandom sequence in the unit interval [0, 1) is called

a sequence of pseudorandom numbers. A discrete-time system is a device or algorithm that, according to some well-defined rule, operates on a discrete-time signal called the input signal or excitation to produce another discrete-time signal called the output signal or response.

Adaptive MISO (multiple input, single output) is an technology for wireless communications in which multiple antennas are used at the source (transmitter). The antennas are combined to minimize errors and optimize data speed. The destination (receiver) has only one output. Self tuning regulator is a system designed to automatically maintain a constant voltage level. The circuit has a primary on one side of a magnet shunt and the tuned circuit coil and secondary on the other side. Here tuning process is performed automatically without any instructions.

In particular, for a prime p we represent the elements of the finite field Fp of p elements by the set {0, 1, ..., p − 1}, and arrive at a sequence of PRNs, say (yn), through a sequence (xn) over Fp satisfying yn = xn/p. The sequence (xn) in this case is usually called a pseudorandom number generator. Various quality measures for randomness of PR sequences are in use. One should note here that the hierarchy among them varies according to the type of problem where PR sequences are needed. Hence single output is obtained in the system.

V. RESULTS

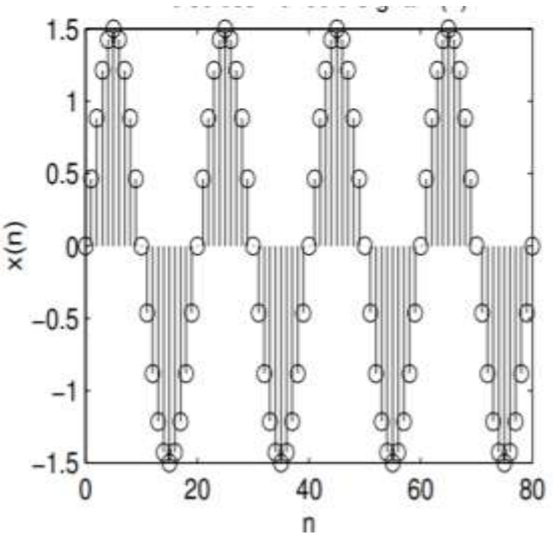

Fig. 2: INPUT SIGNAL

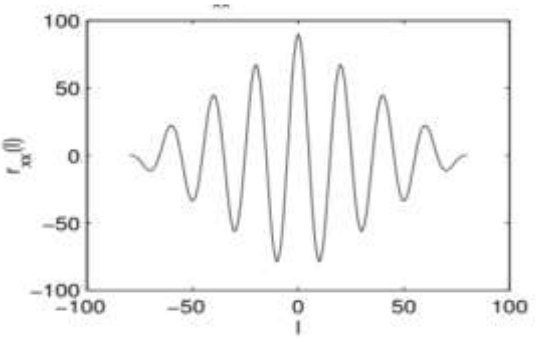

Fig. 3: PSEUDO RANDOM DES SIGNAL

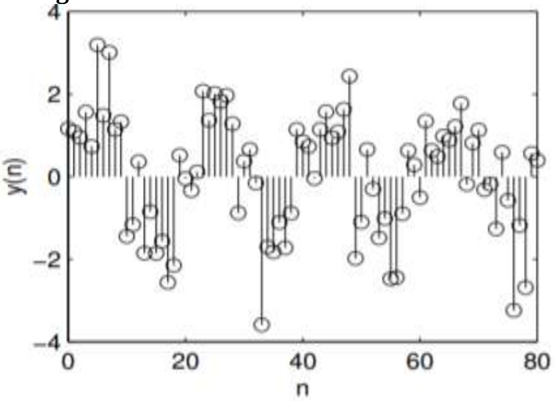

Fig. 4: FAULT DETECTED SIGNAL

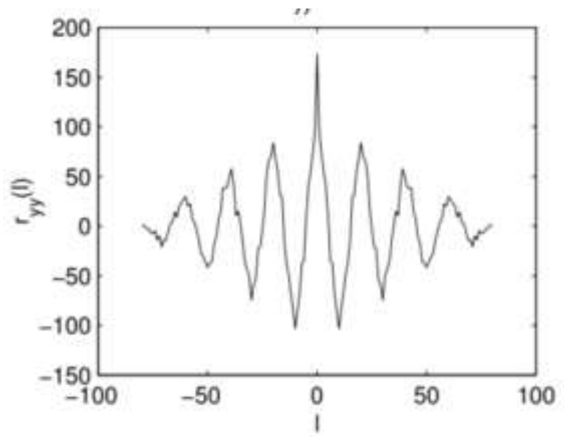

Fig. 5: PSEUDO RANDOM SINGLE OUTPUT SIGNAL

VI. CONCLUSION

In this paper, the designing of advanced pseudo random discrete time estimator was implemented; it is possible to give the accurate estimation for the dynamical system state which is determined by unknown disturbance. For the presence of such estimator the condition is required that is the outputs are equal or more than number of unknown inputs. In fact the regulator rate of convergence is decided by the designer. In this paper the assumption is the outputs are more than number of unknown inputs. The existence condition for estimator do not satisfied because of designing of different faults as unknown inputs. Though, the noisy measurement systems and location of estimator poles are the important function in quality of estimates. Hence the proposed system gives effective output compared to exist one.

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