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1.

Authors: M. A. Zermani, Elyes Feki, Abdelkader Mami

Paper Title: Temperature Acquisition and Control System based on the Arduino

Abstract: Our work presents a low-cost temperature acquisition, for incubator system, based on the Arduino hardware platform; both the hardware and software components are detailed, together with experimental evaluation. This system was designed to facilitate the process of identification and control of a temperature of premature infant incubator. The experimental evaluation revealed that this system is not only capable of temperature signal acquisition, for incubator purposes, but it can also be used as a generic platform for other biomedical applications, greatly extending its applicability. In this paper we describe the proposed platform, with special emphasis on the design principles and functionality. System identification results based on least squares algorithm (RLS) to find the ARMAX input-output mathematical model. We opted for the GPC structure for control temperature. The results of implementation in real time on the neonatal incubator were presented and interpreted.

Keywords: Arduino, Temperature, Incubator, GPC controller

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2.

Authors: Omar E. Elnokity, Imbaby I. Mahmoud, Mohamed K. Refai, Hasan M. Farahat

Paper Title: Hardware Implementation of Virtual Reconfigurable Circuit for Fault Tolerant Evolvable Hardware System on FPGA

Abstract: This research verify and describes a Virtual Reconfigurable Circuit (VRC) that designed and implemented for a Fault Tolerant Evolvable Hardware (EHW) system used to calculate the thermal power output of Egypt's second Training and Research Reactor (ETRR2) during operation. This circuit have three measured input signals from the reactor core: inlet temperature Tin, outlet temperature Tout, mass flow rate Q, and one output, which is the calculated thermal power. In any time the true thermal power reading should be available even one input signal get lost due to a problem in its transducer, or wire cutting, …etc. Typically, this is the function of that Fault Tolerant EHW system. The VRC design will implemented over ordinary Field Programmable Gate Array (FPGA) chip. Reducing the FPGA's configuration bits length++ is the main advantage of using VRC. Most VRCs done before used logic based function elements, while in this work, an arithmetic based elements are used, to accommodate the application nature. The design is fully synthesized on ALTERA Cyclone IV GX Family, and the design gave promising results when targeted to the EP4CGX30CF23C6 FPGA chip.

Keywords: Egypt's second Training and Research Reactor, Evolvable Hardware, Fault Tolerant, Virtual Reconfigurable Hardware,.

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3.	**Authors:**	**Adnan Sharafi, Hamid Sarkheil, Mohammad Kazem Hafizi**	
	Paper Title:	**Inverse Least-Squares Modeling of Induced Polarization and Resistivity Data to Explore Copper Deposits in the Sarbisheh Ophiolites, Iran**	

Abstract: Since the resistivity and induced polarization, methods have an important role for exploration of copper mineralization. Kuh Kheyri area is located south of Sarbisheh in south Khorasan province. This area is located in sheet 1:250000 of Brijand and 1:100000 Sahlabad. The existence of volcanic rocks like Andesite, and the metallic mineralization with small to large sizes in this type of rocks, has made this area quite remarkable of having mining potential. Since surface exploration, methods like geology and geochemistry are not solely capable of determination of depth, direction and dip of mineralization, the geophysical methods can be effective. By taking into consideration the physical changes of existing rocks in the area and also the sulfide mineralization in it, the Induced polarization and resistivity method was used for determination of those areas having low resistivity, and high induced polarization was carries out to distinguish the anomaly zones. The array was used is Dipole-Dipole with 40 meters electrode spacing and 20 meters bond spacing. Four pseudo sections with 100 meters distance of each other as parallel and also two perpendicularly pseudo sections with 50 meters distance from each other are designed and carried out. The total 1218 Induced polarization and electrical resistivity points was measured. The pseudo section of IP and RS was measured and least-squares inversion modeling sections with topographic correction was done with Res2dinv software and then the results was explained and analyzed. The studies has shown that according to surface geological evidences compared with induced polarization sections and resistivity, the maximum amount of chargeability in 3sections with minimum resistivity have good relative accordance and in the other 3 sections, the resistivity is high probably due to the open spaces or silicification of mineralizes zones in this 3 sections, causing the increase of resistivity. In general, according to surface geological and geophysical results, this area has a very good potential for copper mineralization.

Keywords: Copper, Induced Polarization, Least-Squares Inversion, Resistivity, Kuh Khayri.

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4.	**Authors:**	**S. Arun, N. Yashwanth**	
	Paper Title:	**Experimental and Comparison Studies on Drying Characteristics of Grapes in a Solar Tunnel Greenhouse Dryer Coupled with and without Biomass Backup Heater**	

Abstract: A natural convection solar tunnel greenhouse dryer coupled with biomass heater was designed and developed in Nallampalli region of Pollachi, Tamil Nadu (India) and also a natural convection solar tunnel greenhouse dryer without biomass heater was designed and developed in Negamam region of Pollachi, Tamil Nadu (India) for carrying out the experimental and comparison studies of drying characteristics of grapes during the month of May, 2014. About 50kgs of fresh and good quality grapes were loaded into those dryers and it was repeated for

three trails. The mass of fuel added to the biomass heater was about 7.5kg/hr. The biomass heater was ignited when there is a fall in sunshine (after 5PM) in order to maintain the temperature inside the dryer and the fuel used is the remains of the coconuts such as coconut fronts, coconut husk, coconut shell and firewood. The solar tunnel dryer coupled with the biomass heater dried the grapes which has an initial moisture content of 80% (w.b.) to a final moisture content of 10% (w.b.) over a time period of 30 hours whereas the solar tunnel greenhouse dryer without the biomass heater took 55hours for reducing the moisture content of the grapes to the same level. The reduced drying time in the solar tunnel greenhouse dryer coupled with the biomass heater than that of the dryer without the biomass heater is due to the effect of biomass heater that is responsible for the constant increase in temperature inside the dryer which is made possible by supplying sufficient heat during the night time (after 5PM) where there would be a drop in sunshine. Also, the quality of the grapes obtained from the solar tunnel greenhouse dryer coupled with biomass heater was found to be superior to that of the grapes obtained from the solar tunnel greenhouse dryer without the biomass heater which is due to the high temperature and low relative humidity prevailed all the time inside the dryer irrespective of fall in sunshine.

Keywords: Biomass heater, drying time, grapes, moisture content, open sun drying, product quality, solar tunnel greenhouse dryer, sunshine.

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5.	**Authors:**	**S. Arun, N. Yashwanth**
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Abstract: A natural convection solar tunnel greenhouse dryer coupled with biomass heater was designed and developed in Nallampalli region of Pollachi, Tamil Nadu (India) and also a natural convection solar tunnel greenhouse dryer without biomass heater was designed and developed in Negamam region of Pollachi, Tamil Nadu (India) for carrying out the experimental and comparison studies of drying characteristics of red chillies during the month of May, 2014. Three experimental runs with about 50kgs of fresh and good quality red chillies were loaded into those two respective dryers. The mass of fuel added to the biomass heater was about 7.5kg/hr. The biomass was ignited for every one hour after 5PM so as to maintain a high temperature inside the dryer. The solar tunnel dryer coupled with the biomass heater dried the red chillies which has an initial moisture content of 72.98% (w.b.) to a final moisture content of 7.5% (w.b.) over a time period of 30 hours whereas the solar tunnel greenhouse dryer without the biomass heater took 56 hours for reducing the moisture content to the same level. The biomass heater is responsible for supplying sufficient heat inside the dryer to maintain a high temperature steadily inside the dryer even during the times when there would be a drop in sunshine (after 5PM). This high temperature and low relative humidity inside the dryer (with biomass heater) accelerated the drying of red chillies which thereby reduces drying time of the red chillies. Also the quality of the red chillies obtained from the solar tunnel greenhouse dryer coupled with biomass heater was found to be superior to that of the red chillies obtained from the solar tunnel greenhouse dryer without the biomass heater which is due to the high temperature and low relative humidity prevailed all the time inside the dryer irrespective of fall in sunshine that prevented the effect of fungal and bacterial infections, damage from birds and animals and windborne problems like dust & dirt.

Keywords: Biomass heater, drying time, moisture content, open sun drying, product quality, red chillies, solar tunnel greenhouse dryer, sunshine.

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6.

Authors: **Omar E. Elnokity, Imbaby I. Mahmoud, Mohamed K. Refai, Hasan M. Farahat**

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Keywords: Egypt's second Training and Research Reactor, Evolvable Hardware, Fault Tolerant, Virtual Reconfigurable Hardware,.

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