An Analysis Of Synchronous And Asynchronous Communication

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Online first-year writing courses, with all of their promise, still maintain alarmingly low retention and student satisfaction rates, driving online curriculum designers to take another look at ways to increase both retention and satisfaction. To replicate the high rates of face-to-face classes, we must revisit and revise our approach to communication in the first-year writing online classroom. Think about it: The online classroom has abandoned a mainstay in education for thousands of years - synchronous communication. Why have we been so quick to dispose of it? Are we now paying the price? This research will provide additional value to the existing

body of knowledge through analyzing the findings of several studies and determining if a causal link exists between synchronous instructor / student communication and student satisfaction and retention rates in post-secondary first-year online composition courses. The research will also examine if the student's perceived level of teacher presence impacts student satisfaction and retention rates. From this analysis, this thesis will also draw conclusions and make recommendations regarding professional development policies and best practices regarding synchronous communication in the first-year online composition course.

The pervasiveness, as well as the functionality and complexity of embedded systems have significantly increased in recent years. As a result, new challenges were brought to the designing tools. Synchronous programming languages are categorized as one class of the best available tools for designing embedded systems, providing support of concurrency and formal methods to verify embedded systems for safety critical applications. However, the determinism of concurrency relies upon the synchrony hypothesis, which must be verified through Worst Case Reaction Time (WCRT) analysis. The existing approaches for WCRT analysis are based on the techniques that are developed for Worst Case Execution Time (WCET) analysis, which may inefficient for WCRT analysis.

This thesis addresses this issue and proposes a new Integer Linear Programming (ILP) based approach for WCRT analysis. The proposed approach is based on the synchronous programming language called Precision Timed C (PRET-C). The context in the synchronous program level is encoded in the WCRT analysis framework to improve the tightness of the WCRT estimations. For the purpose of evaluating the proposed approach, the state-of-the-art ILP based approach is replicated for PRET-C. The replicated approach is partially based on the existing techniques for WCET analysis. The two approaches are benchmarked in terms of WCRT tightness and analysis time. The obtained WCRT estimations are identical for both approaches. The analysis time of the replicated approach increases exponentially with the size and complexity of the benchmark programs. In comparison, the analysis time of the proposed approach does not show a clear trend of increase with the increase of size and complexity of the benchmark programs. The proposed approach is significantly faster than the replicated approach in large benchmark programs. Despite two decades of massive strides in research and development on control strategies and their subsequent implementation, most books on permanent magnet motor drives still focus primarily on motor design, providing only elementary coverage of control and converters. Addressing that

gap with information that has largely been disseminated only in journals and at conferences, Permanent Magnet Synchronous and Brushless DC Motor Drives is a long-awaited comprehensive overview of power electronic converters for permanent magnet synchronous machines and control strategies for variable-speed operation. It introduces machines, power devices, inverters, and control, and addresses modeling, implementation, control strategies, and flux weakening operations, as well as parameter sensitivity, and rotor position sensorless control. Suitable for both industrial and academic audiences, this book also covers the simulation, low cost inverter topologies, and commutation torque ripple of PM brushless DC motor drives. Simulation of the motor drives system is illustrated with MATLAB® codes in the text. This book is divided into three parts—fundamentals of PM synchronous and brushless dc machines, power devices, inverters; PM synchronous motor drives, and brushless dc motor drives. With regard to the power electronics associated with these drive systems, the author: Explores use of the standard three-phase bridge inverter for driving the machine, power factor correction, and inverter control Introduces space vector modulation step by step and contrasts with PWM Details dead time effects in the inverter, and its compensation Discusses new power converter topologies being considered for low-cost

drive systems in PM brushless DC motor drives This reference is dedicated exclusively to PM ac machines, with a timely emphasis on control and standard, and low-cost converter topologies. Widely used for teaching at the doctoral level and for industrial audiences both in the U.S. and abroad, it will be a welcome addition to any engineer's library. The COVID-19 pandemic caused educational institutions to close for the safety of students and staff and to aid in prevention measures around the world to slow the spread of the outbreak. Closures of schools and the interruption of education affected billions of enrolled students of all ages, leading to nearly the entire student population to be impacted by these measures. Consequently, this changed the educational landscape. Emergency remote education (ERE) was put into practice to ensure the continuity of education and caused the need to reinterpret pedagogical approaches. The crisis revealed flaws within our education systems and exemplified how unprepared schools were for the educational crisis both in K-12 and higher education contexts. These shortcomings require further research on education and emerging pedagogies for the future. The Handbook of Research on Emerging Pedagogies for the Future of Education: Trauma-Informed, Care, and Pandemic Pedagogy evaluates the interruption of education, reports best-practices, identifies the strengths and weaknesses of

educational systems, and provides a base for emerging pedagogies. The book provides an overview of education in the new normal by distilling lessons learned and extracting the knowledge and experience gained through the COVID-19 global crisis to better envision the emerging pedagogies for the future of education. The chapters cover various subjects that include mathematics, English, science, and medical education, and span all schooling levels from preschool to higher education. The target audience of this book will be composed of professionals, researchers, instructional designers, decision-makers, institutions, and most importantly, main-actors from the educational landscape interested in interpreting the emerging pedagogies and future of education due to the pandemic.

The authors propose a criterion for the comparison of different sampling strategies (synchronous, asynchronous and random) and filtering algorithms used in digital instruments which provide the estimate of the time average of a signal processed with a nonlinear conversion of multiple inputs (e.g. wattmeters, RMS voltmeters, . . .). This criterion uses the Bayesian approach to incorporate, for every sampling strategy, any prior information on the influences of each incidental quantity which can vary the output of the instrument, transforming this output into a statistic. The asymptotic mean-squared error of the measurements has been assumed as an

estimator of the error and its general expression, valid for the most common sampling strategies used in practice, has been deduced. This asymptotic error is a function of the frequency response of the digital filter used and, eventually, of the characteristic function of the probability distribution selected for the random variables generating the sampling instants. The particular formulae for different sampling strategies and filtering algorithms are discussed and compared.

The main focus of this research is to understand how the use of communication technology impacts students of color performance in online gateway courses. The analysis for this research study is part of a larger, ongoing study of online students of color at the institution. The archival data was obtained from Introductory to Business and Introductory to Psychology courses taught by instructors trained in the use of text messaging and web synchronous communication tools. Both quantitative and qualitative methods were used to analyze data for this study. The quantitative analysis was conducted on data collected from Introductory to Business and Introductory to Psychology classes that were enhanced with asynchronous communication (text messaging) and synchronous communication (webinars) tools. For the qualitative analysis, the researcher conducted individual one on one interviews. The interview participants were high

achieving students of color who earned a final grade of A in Business 110 or Psychology 150. Chi-square analysis was used to assess the impact that the use of text-messaging and web synchronous communication tools has on student success. The statistical results indicate asynchronous communication (text-messaging) has a stronger impact on students of color than synchronous communication (webinars).

Analysis of Synchronous Machines, Second Edition is a thoroughly modern treatment of an old subject. Courses generally teach about synchronous machines by introducing the steady-state per phase equivalent circuit without a clear, thorough presentation of the source of this circuit representation, which is a crucial aspect. Taking a different approach, this book provides a deeper understanding of complex electromechanical drives. Focusing on the terminal rather than on the internal characteristics of machines, the book begins with the general concept of winding functions, describing the placement of any practical winding in the slots of the machine. This representation enables readers to clearly understand the calculation of all relevant self- and mutual inductances of the machine. It also helps them to more easily conceptualize the machine in a rotating system of coordinates, at which point they can clearly understand the origin of this important representation of the machine. Provides numerical

examples Addresses Park's equations starting from winding functions Describes operation of a synchronous machine as an LCI motor drive Presents synchronous machine transient simulation, as well as voltage regulation Applying his experience from more than 30 years of teaching the subject at the University of Wisconsin, author T.A. Lipo presents the solution of the circuit both in classical form using phasor representation and also by introducing an approach that applies MathCAD®, which greatly simplifies and expands the average student's problem-solving capability. The remainder of the text describes how to deal with various types of transients—such as constant speed transients—as well as unbalanced operation and faults and small signal modeling for transient stability and dynamic stability. Finally, the author addresses large signal modeling using MATLAB®/Simulink®, for complete solution of the non-linear equations of the salient pole synchronous machine. A valuable tool for learning, this updated edition offers thoroughly revised content, adding new detail and better-quality figures.

This paper is concerned with the analysis of synchronous, special purpose, multiple-processor systems, including, e.g., systolic arrays. There have been some results on this problem, especially by Melhem and Rheinboldt. Our approach is different, combing ideas well known in linear system theory with

certain graph-theoretical concepts from computer science. A by-product of our approach to the analysis program is a rigorous characterization of the notion of equivalence between iterative algorithms.

In order to be successful, online learning should be planned systematically. It can be said that offering distance education courses without preparation and knowledge about the theoretical background can cause drawbacks. While distance education has become widespread and popular, it is observed that there could be problems in its application. Such problems can include technical problems, inability to meet the learning needs at the learners' own speeds, lack of communication among learners and between learners and teachers, and lack of quality materials appropriate for online learning or the inclusion of materials used in traditional methods directly into online learning. For successful online courses, these critical aspects of distance education are important, and they should be taken into account by the institutions and the instructors offering online courses. The Handbook of Research on Managing and Designing Online Courses in Synchronous and Asynchronous Environments provides up-to-date knowledge and experiences regarding technologies, processes, and environments for online course design in distance education systems and covers topics related to the aspects of successful distance education systems with a focus on teaching and learning in online environments. Focusing on topics such as instructional design and integrated systems, it is an ideal guide for online course designers, instructional

designers, curricula developers, administrators, educators, researchers, trainers, and students.

Wind power penetration is rapidly increasing in today's energy generation industry. In particular, the doubly-fed induction generator (DFIG) has become a very popular option in wind farms, due to its cost advantage compared with fully rated converter-based systems. Wind farms are frequently located in remote areas, far from the bulk of electric power users, and require long transmission lines to connect to the grid. Series capacitive compensation of DFIG-based wind farm is an economical way to increase the power transfer capability of the transmission line connecting the wind farm to the grid. For example, a study performed by ABB reveals that increasing the power transfer capability of an existing transmission line from 1300 MW to 2000 MW using series compensation is 90% less expensive than building a new transmission line. However, a factor hindering the extensive use of series capacitive compensation is the potential risk of subsynchronous resonance (SSR). The SSR is a condition where the wind farm exchanges energy with the electric network, to which it is connected, at one or more natural frequencies of the electric or mechanical part of the combined system, comprising the wind farm and the network, and the frequency of the exchanged energy is below the fundamental frequency of the system. This oscillatory phenomenon may cause severe damage in the wind farm, if not prevented. Therefore, this book studies the SSR phenomenon in a capacitive series compensated wind farm. A DFIG-based wind farm, which is connected to a series compensated

transmission line, is considered as a case study. The book consists of two main parts: Small-signal modeling of DFIG for SSR analysis: This part presents a step-by-step tutorial on modal analysis of a DFIG-based series compensated wind farm using Matlab/Simulink. The model of the system includes wind turbine aerodynamics, a 6th order induction generator, a 2nd order two-mass shaft system, a 4th order series compensated transmission line, a 4th order rotor-side converter (RSC) controller and a 4th order grid-side converter (GSC) controller, and a 1st order DC-link model. The relevant modes are identified using participation factor analysis. Definition of the SSR in DFIG-based wind farms: This part mainly focuses on the identification and definition of the main types of SSR that occur in DFIG wind farms, namely: (1) induction generator effect (SSIGE), (2) torsional interactions (SSTI), and (3) control interactions (SSCI).

Analysis of Synchronous MachinesCRC Press

In Finite Element Analysis of Electrical Machines the author covers two-dimensional analysis, emphasizing the use of finite elements to perform the most common calculations required of machine designers and analysts. The book explains what is inside a finite element program, and how the finite element method can be used to determine the behavior of electrical machines. The material is tutorial and includes several completely worked out examples. The main illustrative examples are synchronous and induction machines. The methods described have been used successfully in the design and analysis of most types of rotating and linear machines. Audience: A valuable reference source for academic researchers, practitioners and designers

of electrical machinery.

This thesis provides a crosstalk analysis of optical chip interconnects via single-mode waveguides with synchronous transmission and asynchronous transmission. This crosstalk model is general and can be used for any type of waveguide network. Three cases of laser sources will be considered: (1) each channel operates with an independent laser sources, (2) all laser sources have the same mean wavelength but with different phase noise processes, and (3) all laser sources are identical with the exception of the initial phases. The analysis takes into account the coupling-induced crosstalks between adjacent waveguides, the laser linewidth, the shot noise, the dark current generated by the photodiode, and the post-detection thermal noise. Bit error probabilities versus received peak powers are presented together with power penalties.

Seminar paper from the year 2004 in the subject English Language and Literature Studies - Other, grade: 2, University of Marburg, course: E-Learning, 14 entries in the bibliography, language: English, abstract: This work tries to give a survey of the main communication tools, both synchronous and asynchronous that are (or have been) used in e-learning. After evaluating the respective advantages and disadvantages that are exhibited by the different modes of communication, a brief look will be taken at the social factors that may influence online communication. Concluding, several suggestions and recommendations can be made as to facilitate the use of (a)synchronous communication tools in e-learning. Communicating with teachers and co-learners is an important factor for the conventionalisation of newly acquired knowledge (Schulmeister 2003:159), so some care should be taken to enable both students and tutors to make optimal use of the facilities for communication they are provided with, as well as to take care to offer the needed diversity in communication tools.

In modern life, reactive systems are widely used in cyber-physical systems (CPS), such as airplanes and medical devices. One common characteristic of these systems is that they provide services by continuously interacting with our physical world. Thus, they often have strict requirements for functionality and timing. A system is classified as safety-critical if its malfunction may harm our well-being. Synchronous languages are ideally suited for designing safety-critical reactive systems. These languages provide guarantees on soundness such as determinism and reactivity of correct synchronous programs, which are known to be causal. Consequently, this allows the formal verification of functional properties and Worst-Case Reaction Time (WCRT). However, since the invention of the synchronous paradigm, there has been not many innovations regarding WCRT analysis. There has been only limited efforts to try and further both precision and scalability during these analyses, especially for programs involving a large number of threads. In addition, utilising power management in the synchronous paradigm, which is a key aspect for battery powered CPS, has received scant attention. In this thesis, we aim to address these shortcomings. WCRT analysis is essential for reactive systems, since they interact with our physical world. An output is considered correct if it is delivered in a timely manner. However, as the size of modern systems grow, existing techniques fail to deliver preciseWCRT estimates in a scalable manner. Our first attempt to solve this problem is presented in Chapter 3. We propose an iterative WCRT analysis called ILPC (ILP concurrent), based on Integer Linear Programming (ILP). ILP is conventionally known to be scalable, but produces pessimistic estimates. We discover that this is due to the abstraction of tick alignment in the ILP model, which trades precision for scalability. A key to achieve both precision and scalability is to incorporate the tick

alignment but keep it separate from path analysis. In ILPC we divide WCRT analysis into two parts, and for each partwe develop suitable ILP based techniques. The proposed algorithm combines the two parts in an iterative manner to compute the WCRT. Our second attempt for scalable WCRT analysis is presented in Chapter 4, and it is based on explicit path enumeration. Conventional explicit path enumeration techniques include model checking and reachability analysis. A well-known problem of this approach is state explosion caused by the composition of concurrent threads. To tackle this problem, we develop a WCRT analysis technique called WCRT algebra, which is an adaptation of a min-max-plus algebra. We propose the idea of WCRT equivalence in modelling the control ow, and subsequently realise this as Tick Cost Automata (TCA). Using TCAs can effectively allow concurrent threads to be quickly composed without sacrificing precision. Both ILPc and WCRT algebra are benchmarked against the state-of-the-art published WCRT techniques using a set of industrial applications. The results show that both techniques are as precise as the existing techniques while being orders of magnitude faster in many instances. On average, ILPc is over 10 times faster than published WCRT techniques, and over 1000 times faster for large programs. WCRT algebra is about 3.5 time faster than ILPc. Finally, the last aspect this thesis tackles is the power management question for synchronous programs. While there are many exiting algorithms available for Real-Time Operating systems, they are not suited to the synchronous paradigm since they are tightly coupled with their adjoining schedulers. In Chapter 5, we propose a framework to combine Dynamic Voltage Frequency Scaling (DVFS) with the synchronous paradigm for the first time. Along with the framework, we develop a bi-criteria optimisation technique to automatically explore the trade-o s between timing and energy consumption using the

concept of Pareto Optimality. We evaluate our approach against a conventional approach, where a single frequency is used throughout the execution. The results show that the proposed approach is able to produce more non-dominated options for the user providing more exibility. In conclusion, this thesis has pushed the boundary of the synchronous paradigm and opens new opportunities for its applications, especially for safety-critical CPS, which may have energy and timing constraints.

Presents the design and simulation of seven synchronous and self-timed 32-bit adders. This research shows that self-timed adders can provide performance gains while consuming less energy. Also, it shows the inadequacy of characterizing self-timed adder performance using randomly distributed input operands, and presents a new self-timed adder characterization benchmark.

An embedded system is loosely defined as any system that utilizes electronics but is not perceived or used as a general-purpose computer. Traditionally, one or more electronic circuits or microprocessors are literally embedded in the system, either taking up roles that used to be performed by mechanical devices, or providing functionality that is not otherwise possible. The goal of this book is to investigate how formal methods can be applied to the domain of embedded system design. The emphasis is on the specification, representation, validation, and design exploration of such systems from a high-level perspective. The authors review the framework upon which the theories and experiments are based, and through which the formal methods are linked to synthesis and simulation. A formal verification methodology is formulated to verify general properties of the designs and demonstrate that this methodology is efficient in dealing with the problem of complexity and effective in finding bugs. However, manual intervention in the form of abstraction

selection and separation of timing and functionality is required. It is conjectured that, for specific properties, efficient algorithms exist for completely automatic formal validations of systems. Synchronous Equivalence: Formal Methods for Embedded Systems presents a brand new formal approach to high-level equivalence analysis. It opens design exploration avenues previously uncharted. It is a work that can stand alone but at the same time is fully compatible with the synthesis and simulation framework described in another book by Kluwer Academic Publishers Hardware-Software Co-Design of Embedded Systems: The POLIS Approach, by Balarin et al. Synchronous Equivalence: Formal Methods for Embedded Systems will be of interest to embedded system designers (automotive electronics, consumer electronics, and telecommunications), micro-controller designers, CAD developers and students, as well as IP providers, architecture platform designers, operating system providers, and designers of VLSI circuits and systems.

The synchronous motor, despite its apparently inherent drawbacks, has become one of the most commonly used driving units for supplying power. In particular, the rapid progress in high-power semiconductor technology has opened up attractive possibilities for designing fast and multivariable controllers for handling abnormal operational conditions. A systematic study of the questions related to the nonstationary performance of synchronous motors accompanied by a change in kinetic energy of their inertial masses is presented in this volume. Special attention is paid to the transient stability of synchronous motors subjected to various abnormal operating conditions. The generalized investigations fully exploit the optimization offered by computer methods, enabling the authors to avoid the basic drawbacks of the purely analytical methods and to draw up some generalized diagrams of the ultimate transient stability

limits. Theoretical results are compared with a number of practical examples. Of the transient faults, the problems of resynchronisation are the most closely examined, e.g.