Title: **Generalized weighted composition operators from Zygmund spaces to Bloch-Orlicz type spaces**

Author: Hong-bin Bai, Zhi-jie Jiang

Sources: *Applied Mathematics and Computation* ,273 (2016) :89–97 **(A2)**

Abstract: Let $\mathbb{D}$ be the open unit disk in the complex plane $\mathbb{C}$ and $H(\mathbb{D})$ the class of all analytic functions on $\mathbb{D}$. Let Φ be an analytic self-map of $\mathbb{D}$ and $\psi \in H(\mathbb{D})$. In this paper the boundedness and compactness of the generalized weighted composition operator $D^n_{\varphi,\psi} f = \psi f^{(n)} \circ \varphi$ from the Zygmund space to the Bloch – Orlicz space and the little Bloch – Orlicz space are characterized

Keywords: Zygmund space; Bloch–Orlicz space; Little Bloch–Orlicz space; Generalized weighted composition operator; Boundedness; Compactness.

Title: **Product-type operators from weighted Bergman-Orlicz spaces to Bloch-Orlicz spaces**

Authors: HONG-BIN BAI , ZHI-JIE JIANG

Sources: *Journal of Computational Analysis and Applications,* Volume 21, Number 7 December 15, 2016:1147-1159 **(A4)**

Abstract: Let D = {z ∈ C : |z| < 1} be the open unit disk, φ an analytic self-map of D and ψ an analytic function on D. Let D be the differentiation operator and $W_{\varphi,\ \psi}$ the weighted composition operator. The boundedness and compactness of the product-type operators $DW_{\varphi,\ \psi}$ from the weighted Bergman-Orlicz spaces to the Bloch-Orlicz spaces on D are characterized.

Title: **Novel Robust Exponential Stability of Markovian Jumping Impulsive Delayed Neural Networks of Neutral-Type with Stochastic Perturbation**

Authors: Yang Fang, Kelin Li, Yunqi Yan

Sources: *Mathematical Problems in Engineering Volume,* 2016, Article ID 1492908, 20 pages **(A3)**

Abstract: The robust exponential stability problem for a class of uncertain impulsive stochastic neural networks of neutral-type with Markovian parameters and mixed time-varying delays is investigated. By constructing a proper exponential-type Lyapunov- Krasovskii functional and employing Jensen integral inequality, free-weight matrix method, some novel delay-dependent stability Criteria that ensure the robust exponential stability in mean square of the trivial solution of the considered networks are established in the form of linear matrix inequalities (LMIs). The proposed results do not require the derivatives of discrete and distributed time-varying delays to be 0 or smaller than 1. Moreover, the main contribution of the proposed approach compared with related methods lies in the use of

three types of impulses. Finally, two numerical examples are worked out to verify the effectiveness and less conservativeness of our theoretical results over existing literature.

Title: **Product-Type Operators from Logarithmic Bergman-Type Spaces to Zygmund–Orlicz Spaces**

Authors: Zhi-Jie Jiang

Sources: *Mediterranean Journal of Mathematics,* (2016) 13:4639-4659 **(A3)**

Abstract: Abstract. Let D be the open unit disk in the complex plane C and H(D) the class of all analytic functions on D. Let φ be an analytic self-map of D and u ∈ H(D). As a class of new space, we first study the properties of the logarithmic Bergman-type space. We also use Young's function to define another new space as a generalization of Zygmund space, called the Zygmund–Orlicz space. We study some of its proper-ties and show that the Zygmund–Orlicz space is isometrically equal to certain Zygmund-type space for a very special weight. This allows us to define the little Zygmund–Orlicz space which is a closed subspace of the Zygmund–Orlicz space. As some applications of properties obtained, we characterize the boundedness and compactness of the product-type operators D n M u C φ , D n C φ M u , C φ D n M u , M u D n C φ , M u C φ D n , and C φ M u D n from the logarithmic Bergman-type space to the Zygmund–Orlicz space and the little Zygmund–Orlicz space.

Keywords: Logarithmic Bergman-type space, Zygmund–Orlicz space, little Zygmund–Orlicz space, product-type operator, boundedness, com-pactness.

Title: **Convergence of exceedance point processes of normal sequences with a seasonal component and its applications**

Authors: Yingying Jiang, Baokun Li, Fuming Lin

Sources: *Journal of Inequalities and Applications,* (2016) 2016:141 **(A3)**

Abstract: In this paper, we prove that, under some mild conditions, a time-normalized point process of exceedances by a nonstationary and strongly dependent normal sequence with a seasonal component converges in distribution to the in plane Cox process. As an application of the convergence result, we deduce two important joint limit distributions for the order statistics.

Keywords: in plane Cox process, exceedance point process, nonstationary sequences with a seasonal component, strongly dependent normal sequences, kth maxima

Title: **A New Modified Artificial Bee Colony Algorithm with Exponential Function Adaptive Steps**

Authors: Wei Mao, Heng-you Lan, Hao-ru Li

Sources: *Computational Intelligence and Neuroscience*, Volume 2016, Article ID 9820294, 13 pages **(A4)**

Abstract: As one of the most recent popular swarm intelligence techniques, artificial bee colony algorithm is poor at exploitation and has some defects such as slow search speed, poor population diversity, the stagnation in the working process, and being trapped into the local optimal solution. The purpose of this paper is to develop a new modified artificial bee colony algorithm in view of the initial population structure, subpopulation groups, step updating, and population elimination. Further, depending on opposition- based learning theory and the new modified algorithms, an improved S-type grouping method is proposed and the original way of roulette wheel selection is substituted through sensitivity-pheromone way. Then, an adaptive step with exponential functions is designed for replacing the original random step. Finally, based on the new test function versions CEC13, six benchmark functions with the dimensions D = 20 and D= 40 are chosen and applied in the experiments for analyzing and comparing the iteration speed and accuracy of the new modified algorithms. The experimental results show that the new modified algorithm has faster and

Title: **Convergence Analysis of New Iterative Approximating Schemes with Errors for Total Asymptotically Nonexpansive Mappings in Hyperbolic Spaces**

Authors: Ting-jian Xiong, Heng-you Lan

Sources: *Journal of Computational Analysis and Applications*, Volume 20, Number 5 May 2016: 902-913 **(A4)**

Abstract: The purpose of this paper is to introduce the concept of total asymp-totically nonexpansive mappings and to prove some Δ-convergence theorems of it-eration processes with errors to approximating a common fixed point for four total asymptotically nonexpansive mappings in hyperbolic spaces. The results presented in the paper extend and improve some recent results announced in the current lit-erature.

Key Words and Phrases: New iterative approximations with errors, asymptoti-cally nonexpansive mapping, total asymptotically nonexpansive mapping, common fixed point, convergence analysis.

Title: **Outer synchronization of fractional-order complex dynamical networks**

Authors: Yong Yang, Yu Wang, Tianzeng Li

Sources: *Optik* , 127 (2016): 7395–7407 **(A4)**

Abstract: The outer synchronization between two complex dynamical networks with fractional-order chaotic nodes is studied. A new fractional-order controller for outer synchronization of complex networks is presented. And some new sufficient synchronization criteria are proposed based on the LaSalle invariance principle and the Lyapunov stability theory. This method can apply to arbitrary fractional-order complex networks in which the coupling-configuration matrix and the inner-coupling matrix are not assumed to be symmetric or irreducible. It means that this method is more general and effective. Numerical simulations of three fractional-order complex networks demonstrate the universality and the effectiveness of the proposed method.

Keywords: Outer synchronization, Fractional-order complex network, Lyapunov stability theor

Title: **CONVERGENCE RATE OF EXTREMES FOR THE GENERALIZED SHORT-TAILED SYMMETRIC DISTRIBUTION**

Authors: Fuming Lin, Zuoxiang Peng, Kaizhi Yu

Sources: *Bull. Korean Math. Soc.* 53 (2016), No. 5, pp: 1549–1566 **(A4)**

Abstract: Denote M n the maximum of n independent and identically distributed variables from the generalized short-tailed symmetric distribution. This paper shows the pointwise convergence rate of the distribution of M n to $\exp(-e^{-x})$ and the supremum-metric-based convergence rate as well.

Title: **A characterization of L 3 (4) by its character degree graph and order**

Authors: Shitian Liu ,Yunxia Xie

Sources: *SpringerPlus* , (2016) 5:242 **(A4)**

Abstract: Let G be a finite group. The character degree graph $\hat{W}(G)$ of G is the graph whose vertices are the prime divisors of character degrees of G and two vertices p and q are joined by an edge if pq divides the character degree of G. Let L n (q) be the projective special linear group of degree n over a finite field of order q. Khosravi et. al. have shown that the simple groups L2 (p2) , and L2 (p) where $p \in \{7,8,11,13,17,19\}$ are characterizable by the degree graphs and their orders. In this paper, we give a characterization of L 3 (4) by using the character degree graph and its order.

Keywords: Character degree graph, Projective special linear group, Simple group, Character degree

Title: **A one-layer recurrent neural network for non-smooth convex optimization subject to linear inequality constraints**

Authors: Xiaolan Liu, Mi Zhou

Sources: *Chaos, Solitons and Fractals*, 87 (2016): 39–46 **(A3)**

Abstract: In this paper, a one-layer recurrent network is proposed for solving a non-smooth convex optimization subject to linear inequality constraints. Compared with the existing neural networks for optimization, the proposed neural network is capable of solving more general convex optimization with linear inequality constraints. The convergence of the state variables of the proposed neural network to achieve solution optimality is guaranteed as long as the designed parameters in the model are larger than the derived lower bounds.

Keywords: Neural network, Non-smooth analysis, Linear inequality constraints, Lower bounds, Finite-time convergence

Title: **Coupled coincidence point results for Geraghty-type contraction by using monotone property in partially ordered S-metric spaces**

Authors: Mi Zhou , Xiao-lan Liu , Diana Doli´ canin-Deki´, Boˇ sko Damjanovi´

Sources: *J. Nonlinear Sci. Appl*, 9 (2016): 5950–5969 **(A2)**

Abstract: In this paper, we introduce a new concept of generalized compatibility for a pair of mappings defined on a product S-metric and prove certain coupled coincidence point results for mappings satisfying Geraghty-type contraction by using g-monotone instead of the usually mixed monotone property. We also give some sufficient conditions for the uniqueness of a coupled coincidence point. Our results generalize the corresponding results of Zhou and Liu [M. Zhou, X.-L. Liu, J. Funct. Spaces, 2016 (2016), 9 pages], without mixed weakly monotone property and Kadelburg et al. [Z. Kadelburg, P. Kuman, S. Radenovi´ c, W. Sintunavarat, Fixed Point Theory Appl., 2015 (2015), 14 pages] from usually metric to S-metric. An illustrative example is presented to support our results.

Keywords: Coupled coincidence point, generalized compatibility, monotone property, partially ordered S-metric space, Geraghty-type contraction.

Title: **On Coupled Common Fixed Point Theorems for Nonlinear Contractions with the Mixed Weakly Monotone Property in Partially Ordered S-Metric Spaces**

Authors: Mi Zhou , Xiao-Lan Liu

Sources: *Journal of Function Spaces,* Volume 2016, Article ID 7529523, 9 pages **(A4)**

Abstract: The main aim of this paper is to establish some coupled common fixed point theorems under a Geraghty-type contraction using mixed weakly monotone property in partially ordered S-metric space. Also, we give some sufficient conditions for the uniqueness

Title: **Some new fixed point results in partial ordered metric spaces via admissible mappings and two new functions**

Authors: Xiao-lan Liu , Arslan Hojat Ansari , Sumit Chandok , Choonkil Park

Sources: *J. Nonlinear Sci. Appl,* 9 (2016): 1564–1580 **(A2)**

Abstract: The purpose of this paper is to discuss the existence of fixed points for new classes of mappings defined on an ordered metric space. The obtained results generalize and improve some fixed point results in the literature. Some examples show the usefulness of our results.

Keywords: Common fixed point, generalized weakly contraction, generalized metric spaces, upper class, C-class function.

Title: **3D Trajectory Reconstruction From Monocular Vision Based on Prior Spatial Knowledge**

Authors: Changjiang Liu , Yi Zhang

Sources: *IEEE SENSORS JOURNAL,* VOL. 16, NO. 3, FEBRUARY 1, 2016: 817-822 **(A3)**

Abstract: Abstract—This paper proposed a monocular vision system to reconstruct 3D plane take-off trajectory. This system is designed for airport dynamic surveillance under low visibility conditions. The main purpose of our system is to help traffic controllers to monitor flights taking off in multi-view.

Keywords: Index Terms—Background subtraction, inter-frame difference, object extraction, camera calibration, trajectory reconstruction.

Title: **Some Chaotic Properties of a Coupled Lattice System Related with Belusov-Zhabotinsky Reaction**

Authors: Tianxiu Lu , Risong Li

Sources: *Qualitative Theory of Dynamical Systems,* DOI 10.1007/s12346-016-0210-3 **(A3)**

Abstract: In Guirao(MATCH Commun Math Comput Chem 64:335–344,2010) studied distributional chaos of a family of coupled lattice dynamical systems(CLSs) which generalize the model stated by Kaneko (Phys Rev Lett 65:1391–1394, 1990). He also presented a definition of distributional chaos on asequence(DCS) for CLSs and stated two different sufficient conditions for a given CLS to exhibit DCS. Inspired by his work, in this paper we explore some chaotic properties of the map which is deduced by a kind of coupled map lattice (CML). In particular, some sufficient conditions under which a given CML is (F1,F2)-chaotic, ω-chaotic or topologically chaotic are obtained. And the conclusions discussed above are examined when the metric changes. Moreover, it is pointed out that some CMLs can be simplified to a simpler CLS.

Keywords: Coupled map lattices , Chaos , Furstenberg family , Topological entropy

Title: **Dual delay-partitioning approach to stability analysis of generalized neural networks with interval time-varying delay**

Authors: Jun Yang, Wen-Pin Luo, Hao Chen , Xiao-Lan Liu

Sources: *Neurocomputing* ,214 (2016): 857–865 **(A3)**

Abstract: This paper is concerned with improved delay-dependent stability criteria for generalized neural net-works (GNNs) with interval time-varying delay. A dual delay-partitioning approach is introduced to partition the delay intervals $[0,\tau_a]$, and $[\tau_a,\tau_b]$ into different multi-segments separately. A newly aug-mented Lyapunov–Krasovskii functional (LKF) with triple integral terms is constructed by dual–parti-tioning the delay in integral terms, in which the relationships between the augmented state vectors are fully taken into account. The Wirtinger-based integral inequality and Peng-Park's integral inequality are employed to effectively handle the cross-product terms occurred in derivative of the LKF. Therefore, less conservative results can be achieved in terms of e s and LMIs. Finally, two numerical examples are in-cluded to show that the deduced criteria are less conservative than existing ones

Keywords: Generalized neural networks (GNNs), Stability analysis, Lyapunov-Krasovskii functional (LKF), Interval time-varying delay, Delay-partitioning approach

Title: **Free-Matrix-based Integral Inequality for Stability Analysis of Uncertain T-S Fuzzy Systems with Time-varying Delay**

Authors: Wen-Pin Luo, Jun Yang, and Xin Zhao

Sources: *International Journal of Control Automation and Systems* ,14(4) (2016): 948-956 **(A4)**

Abstract: This paper focuses on further improved stability criteria for uncertain T-S fuzzy systems with time-varying delay by delay-partitioning approach and Free-Matrix-based integral inequality. A modified augmented Lyapunov-Krasovskii functional (LKF) is established by partitioning the delay in all integral terms. Then, on the basis of taking into account the independent upper bounds of the delay derivative in various delay intervals, some new results on tighter bounding inequalities, such as Peng-Park’s integral inequality and the Free-Matrix-based integral inequality are employed to effectively reduce the enlargement in bounding the derivative of LKF, therefore, less conservative results can be expected in terms of e s and LMIs. Finally, three numerical examples are included to show that the proposed method is less conservative than existing ones.

Keywords: Delay-partitioning approach, free-matrix-based integral inequality, linear matrix inequalities (LMIs), Lyapunov-Krasovskii functional (LKF), stability, time-varying delay, T-S fuzzy systems.

Title: **Improved stability criteria for generalized neural networks with time-varying delay by auxiliary function-based integral inequality**

Authors: Zhi-Wen Chen , Jun Yang , Wen-Pin Luo

Sources: *Advances in Difference Equations* ,(2016) 2016:204 **(A3)**

Abstract: This paper is mainly concerned with improved stability criteria for generalized neural networks (GNNs) with time-varying delay by delay-partitioning approach. A newly augmented Lyapunov-Krasovskii functional (LKF) with triple integral terms is constructed by decomposing integral interval, in which the relationships between the augmented state vectors are fully taken into account. The tighter bounding inequalities such as a Wirtinger-based integral inequality, Peng-Park's integral inequality, and an auxiliary function-based integral inequality are employed to effectively handle the cross-product terms occurred in derivative of the LKF. As a result, less conservative delay-dependent stability criterion can be achieved in terms of e s and LMIs. Finally, two numerical examples are included to show that the proposed results are less conservative than existing ones.

Keywords: generalized neural networks (GNNs), stability analysis, Lyapunov-Krasovskii functional (LKF), time-varying delay, delay-partitioning approach, auxiliary function-based integral inequality

Title: **A wave breaking criterion for a modified periodic two-component Camassa-Holm system**

Authors: Ying Wang

Sources: *Journal of Inequalities and Applications,* (2016) 2016:85 **(A3)**

Abstract: In this paper, a wave-breaking criterion of strong solutions is acquired in the Soblev space $H^s(S)\times H^{s-1}(S)$ with s > 3/2 by employing the localization analysis in the transport equation theory, which is different from that of the two-component Camassa-Holm system.

Keywords: a modified periodic two-component Camassa-Holm system, wave-breaking criterion, localization analysis

Title: **Exact traveling wave solutions and L^1 stability for the shallow water wave model of moderate amplitude**

Authors: Ying Wang , Yunxi Guo

Sources: *Analysis and Mathematical Physics,* DOI 10.1007/s13324-016-0139-3 **(A4)**

Abstract: In this paper, we developed, for the first time, the exact expressions of several periodic travelling wave solutions and a solitary wave solution for a shallow water wave model of moderate amplitude. Then, we present the existence theorem of the global weak solutions. Finally, we prove the stability of solution in L^1(R) space for the Cauchy

problem of the equation.

Keywords: Travelling wave , Existence , L^1 stability , The model equation for shallow water of moderate amplitude

Title: **A second-order parareal algorithm for fractional PDEs**

Authors: Shu-Lin Wu

Sources: *Journal of Computational Physics*, 307 (2016): 280–290 **(A2)**

Abstract: We are concerned with using the parareal (parallel-in-time) algorithm for large scale ODEs system $U`(t)+AU(t)+dA^{\alpha}U(t)=F(t)$ arising frequently in semi-discretizing time-dependent PDEs with spatial fractional operators, where d > 0 is a constant, α ∈ (0 , 1) and A is a spare and symmetric positive definite (SPD) matrix. The parareal algorithm is iterative and is characterized by two propagators F and G , which are respectively associated with small temporal mesh size ? t and large temporal mesh size ? T. The two mesh sizes satisfy Δ T = J Δ t with J ≥ 2 being an integer, which is called mesh ratio. Let T_{unit}^{f} and T_{unit}^{g} be respectively the computational cost of the two propagators for moving forward one time step. Then, it is well understood that the speedup of the parareal algorithm, namely E , satisfies E = O (clog (1 / ρ)) , where c := T_{unit}^{f} / T_{unit}^{g} and ρ is the convergence factor. A larger E corresponds a more efficient parareal solver. For G = Backward-Euler and some choices of F , previous studies show that ρ can be a satisfactory quantity. Particularly, for F = 2nd-order DIRK (diagonally implicit Runge– Kutta), it holds ρ ≈1/3 for any choice of the mesh ratio J. In this paper, we continue to consider F = 2nd-order DIRK, but with a new choice for G , the IMEX (implicit–explicit) Euler method, where the ‘implicit’ and ‘explicit’ computation is respectively associated with A and dA^{α} . Compared to the widely used Backward-Euler method, this choice on the one hand increases c (this point is apparent), and interestingly on the other hand it can also make the convergence factor ρ smaller: ρ ≈1/5 ! Numerical results are provided to support our conclusions.

Keywords: Parareal algorithms, Fractional PDEs, IMEX/Backward-Euler method, 2nd-order DIRK method

Title: **Convergence analysis of the Neumann–Neumann waveform relaxation method for time-fractional RC circuits**

Authors: Shu-Lin Wu, Mohammad Al-Khaleel

Sources: *Simulation Modelling Practice and Theory,* 64 (2016): 43–56 **(A3)**

Abstract: The classical waveform relaxation (WR) methods rely on decoupling the large-scale ODEs system into small-scale subsystems and then solving these subsystems in a Jacobi or Gauss–Seidel pattern. However, in general it is hard to find a clever partition and for

strongly coupled systems the classical WR methods usually converge slowly and non-uniformly. On the contrary, the WR methods of longitudinal type, such as the Robin-WR method and the Neumann–Neumann waveform relaxation (NN-WR) method, possess the advantages of simple partitioning procedure and uniform convergence rate. The Robin-WR method has been extensively studied in the past few years, while the NN-WR method is just proposed very recently and does not get much attention. It was shown in our previous work that the NN-WR method converges much faster than the Robin-WR method, provided the involved parameter, namely β , is chosen properly. In this paper, we perform a convergence analysis of the NN-WR method for time-fractional RC circuits, with special attention to the optimization of the parameter β . For time-fractional PDEs, this work corresponds to the study of the NN-WR method at the semi-discrete level. We present a detailed numerical test of this method, with respect to convergence rate, CPU time and asymptotic dependence on the problem/discretization parameters, in the case of two- and multi-subcircuits.

Keywords: Waveform relaxation, Parameter optimization, Convergence analysis, RC circuits, Time-fractional problems

Title: **Convergence Analysis of the Parareal-Euler Algorithm for Systems of ODEs with Complex Eigenvalues**

Authors: Shu-Lin Wu

Sources: *J Sci Comput*, (2016) 67:644–668 **(A2)**

Abstract: Parareal is an iterative algorithm and is characterized by two propagators G and F , which are respectively associated with large step size ΔT and small step size Δt, where $\Delta T = J \Delta t$ and $J \geqslant 2$ is an integer. The choice G = F =Backward-Euler denotes the simplest implicit parareal solver, which we call Parareal-Euler, and has been studied widely in recent years. For linear problem U` (t)+AU(t) = g(t) with A being a symmetric positive definite matrix, this algorithm converges very fast and the convergence rate is insensitive to the change of J and Δt. However, for the case that the spectrum of A contains complex values, no provable results are available in the literature so far. Previous studies based on numerical plotting show that we can not expect convergence for the Parareal-Euler algorithm on the whole right-hand side of the complex plane. Here, we consider a representative situation: $\sigma(A) \subseteq D(\theta) := \{(x,iy) \in C : x \geqslant 0, |y| \leqslant \tan(\theta)x\}$ with $\theta \in (0, \pi 2)$, i.e., the spectrum $\sigma(A)$ is contained in a sectorial region. Spectrum distribution of this type arises naturally for semi-discretizing a wide rang of time-dependent PDEs,e.g., the Fokker-Planck equations. We derive condition, which is independent of J and depends on θ only, to ensure convergence of the Parareal-Euler algorithm. Numerical results for initial value and time-periodic problems are provided to support our theoretical conclusions

Keywords: Parareal algorithm , Backward-Euler , Convergence analysis , Complex eigenvalues

Title: **SCHWARZ WAVEFORM RELAXATION ALGORITHM FOR HEAT EQUATIONS WITH DISTRIBUTED DELAY**

Authors: Shu-Lin WU

Sources: *THERMAL SCIENCE,* 2016, Vol. 20, Suppl. 3, pp. S659-S667 **(A4)**

Abstract: Heat equations with distributed delay are a class of mathematic models that has wide applications in many fields. Numerical computation plays an important role in the investigation of these equations, because the analytic solutions of partial differential equations with time delay are usually unavailable. On the other hand, duo to the delay property, numerical computation of these equations is time-consuming. To reduce the computation time, we analyze in this paper the Schwarz waveform relaxation algorithm with Robin transmission conditions. The Robin transmission conditions contain a free parameter, which has a significant effect on the convergence rate of the Schwarz waveform relaxation algorithm. Determining the Robin parameter is therefore one of the top-priority matters for the study of the Schwarz waveform relaxation algorithm. We provide new formu-la to fix the Robin parameter and we show numerically that the new Robin pa-rameter is more efficient than the one proposed previously in the literature.

Keywords: Schwarz waveform relaxation, heat equation, distributed delay, parameter optimization, convergence analysis

Title: **Towards essential improvement for the Parareal-TR and Parareal-Gauss4 algorithms**

Authors: Hong Shu-Lin Wu

Sources: *Journal of Computational and Applied Mathematics,* 308 (2016): 391–407 **(A2)**

Abstract: Parareal is an iterative algorithm and is characterized by two propagators G and F , which are respectively associated with large step size ΔT and small step size Δt, where ΔT = JΔ t and J ⩾ 2 is an integer. For symmetric positive definite (SPD) system u ′ (t)+ Au (t) = g (t) arising from semi-discretizing time-dependent PDEs, if we fix the G -propagator to the Backward-Euler method and choose for F some L-stable time-integrator it can be proven that the convergence factors of the corresponding parareal algorithms satisfy ρ ≈1/3 , ∀J⩾2 and ∀σ(A) ⊂ [0 ,+∞) , where σ(A) is the spectrum of the matrix A. However, this result does not hold when time-integrators that lack L-stability, such as the Trapezoidal rule and the 4th-order Gauss RK method, are chosen as the F-propagator. The parareal algorithms using these two methods for the F -propagator are denoted by Parareal-TR and Parareal-Gauss4. In this paper, we propose a strategy to let these two parareal algorithms possess such a uniform convergence property. The idea is to choose an L-stable propagator $\widetilde{F}$ and on each coarse time-interval [T n , T n+1] we perform first two steps of $\widetilde{F}$, then followed by J−2 steps of $\widetilde{F}$ .Precisely, for the Trapezoidal rule we select the 2nd-order SDIRK method as the $\widetilde{F}$ -propagator, and for

the 4th-order Gauss RK method we select the 4th-order Lobatto III-C method as the $\tilde{F}$ -propagator. Numerical results are given to support our theoretical conclusions.

Keywords: Parareal, Trapezoidal rule, 4th-order Gauss RK method,Convergence analysis

Title: **Secure outsourcing of modular exponentiations in cloud and cluster computing**

Authors: Jun Ye ,Zheng Xu , Yong Ding

Sources: *Cluster Comput*, (2016) 19:811–820 **(A3)**

Abstract: Cloud computing and cluster computing are user-centric computing services. The shared software and hardware resources and information can be provided to the computers and othere quipments according to the demands of users. A majority of services are deployed through outsourc-ing. Outsourcing computation allows resource-constrained clients to outsource their complex computation workloads to a powerful server which is rich of computation resources. Modular exponentiation is one of the most complex com-putations in public key based cryptographic schemes. It is useful to reduce the computation cost of the clients by using outsourcing computation. In this paper, we propose a novel outsourcing algorithm for modular exponentiation based on the new mathematical division under the setting of two non-colluding cloud servers. The base and the power of the outsourced data can be kept private and the efficiency is improved compared with former works.

Keywords: Modular exponentiations, Outsourcing computation, Verification, Cloud computing

Title: **Some analysis results associated with the optimization problem for a discrete-time finite-buffer NT-policy queue**

Authors: Miaomiao Yu , Attahiru Sule Alfa

Sources: *Oper Res Int J* ,(2016) 16:161–179 **(A4)**

Abstract: The prime objective of this paperis to give some analysis results con-cerning the discrete-time finite-buffer NT-policy queue, which can be utilized to determine the optimal threshold values. By recording the waiting time of the leading customer in server’s vacation period, the model is successfully described as a vector-valued Markov chain. Meanwhile, depending on the special block structure of the one-step transition probability matrix, the equilibrium queue length distri-bution is calculated through a more effective UL-type RG-factorization. Due to the number of customers served in the busy period does not have the structure of a Galton-Watson branching process, analysis of the regeneration cycle is regarded as a difficult problem in establishing the cost structure of the queueing system. However, employing the concept of i-busy period and some difference equation solving skills, the explicit expression for the expected length of the regeneration cycle is easily derived, and the stochastic decomposition structure of the busy period is also demonstrated. Finally, numerical results are offered to illustrate how the direct search

method can be implemented to obtain the optimal management policy.

Keywords: NT-policy queue , RG-factorization, i-busy period , Stochastic decomposition , Cost optimization

Title: **Strategic queueing behavior for individual and social optimization in managing discrete time working vacation queue with Bernoulli interruption schedule**

Authors: Miaomiao Yu, Attahiru Sule Alfa

Sources: *Computers & Operations Research*, 73 (2016): 43–55 **(A2)**

Abstract: In this paper, we consider a discrete time working vacation queue with a utility function for the reward of receiving the service and the cost of waiting in the system. A more flexible switching mechanism be-tween low and regular service states is introduced to enhance the practical value of the working vacation queue. Under different precision levels of the system information, namely observable, almost un-observable and fully unobservable cases, the utility function is studied from both the individual custo-mer's and the system administrator's points of view. By analyzing the steady-state behavior of the system, the associated optimal joining decisions under different information scenarios are obtained. We find that for the fully observable queue, the joining threshold for individual optimization may be less than the one for social optimization in working vacation period. A similar situation also appears in almost unobservable case. Such phenomenon is not possible for the classic first come first served queue due to the fact that there is no vacation time and thus will not cause large fluctuations in customers' conditional waiting time. Additionally, we also conduct some numerical comparisons to demonstrate the effect of the information levels as well as system parameters on customer joining behavior.

Keywords: Queueing, Working vacation, Bernoulli interruption schedule, Joining strategy, Conditional sojourn time

Title: **Global Exponential Dissipativity of Static Neural Networks with Time Delay and Impulses**

Authors: Liping Zhang, Shu-Lin Wu, Kelin Li

Sources: *Journal of Computational Analysis and Applications*, Volume 20, Number 4 April 2016: 767-789 **(A4)**

Abstract: In this paper, we investigate the problem of global exponential dissipativity of static neural net-works with time delay and impulses. The impulses are classified into two classes: the ones are input disturbances and the ones are stabilizing. For each type of impulses, by adopting proper Lyapunov function, sufficient conditions for global exponential dissipativity are established in terms of linear matrix inequalities (LMIs). The new sufficient conditions can explicitly reveal the influence of time delay, impulses, etc.,

on the dissipativity. We show that these conditions can be straightforwardly reduced to exponential stability conditions and that these stability con-ditions are remarkably less conservative than the existing ones. Numerical results are given to show the less conservatism of the obtained criteria compared to the existing ones.

Keywords: dissipativity, stability, static neural network, impulse, time delay, LMI.

Title: **非线性弹性地基上悬臂管道的参数振动**

Authors: 李云东， 杨翊仁， 文华斌

Sources: *振动与冲击*, 2016,35(24):14-18 **(A5)**

Abstract: 首先建立了非线性弹性地基上悬臂输流管在振荡流作用下的运动方程，应用Galerkin方法将运动控制偏微分方程离散成常微分方程组。采用数值方法着重讨论了平均流速、脉动幅值、脉动频率和地基剪切刚度等参数对系统动力学行为的影响。结果表明：以平均流速为分岔参数系统会出现拟周期运动，然后是周期运动，接着出现混沌运动；以脉动幅值为分岔参数系统发生周期 2，周期 4，周期 8，然后进入混沌运动；以脉动频率为分岔参数系统先发生拟周期运动，然后在二阶次谐波附近发生混沌运动。另外，地基剪切刚度对系统地周期运动和混沌有抑制作用，随着剪切刚度增大，系统从混沌状态演化到周期状态，直至稳态。

Keywords: 悬臂输流管；弹性地基；周期运动；混沌运动

Title: **Verifiable Delegation of Polynomials**

Authors: Jun Ye , Haiyan Zhang , Changyou Fu

Sources: *International Journal of Network Security,* Vol.18, No.2, PP.283-290, Mar. 2016 **(A5)**

Abstract: Verifiable computation allows a computationally weak client to outsource evaluation of a function on many in-puts to a powerful but untrusted server. The client in-vests a large amount of off-line computation in an amortized manner to obtain an encoding of its function which is then given to the server. The server returns both the evaluation result of the function on the client's input and a proof with which the client can verify the correctness of the evaluation using substantially less effort than doing the evaluation on its own from scratch. In this paper a verifiable delegation of polynomials is proposed based on the integer factorization problem. In the computation procedure, the computation polynomial and the verification polynomial are distinguishable, the wrong result and the result of other inputs will incur a validation failure . And last, the client can verify the result efficiently.

Keywords: Cloud computing, integer factorization, verifiable computation, verifiable delegation

Title: **Robust Exponential Stability of Impulsive Stochastic Neural Networks with Markovian Switching and Mixed Time-varying Delays**

Authors: Haoru Li , Yang Fang , Kelin Li

Sources: *Discontinuity, Nonlinearity, and Complexity,* 5(4) (2016): 427–446 **(D)**

Abstract: This paper is concerned with the robust exponential stability problem for a class of impulsive stochastic neural networks with Markovian switching, mixed time-varying delays and parametric uncertainties. By construct a novel Lyapunov-Krasovskii functional, and using linear matrix inequality (LMI)technique, Jensen integral inequality and free-weight matrix method, several novel sufficient conditions in the form of LMIs are derived to ensure the robust exponential stability in mean square of the trivial solution of the considered system. The results obtained in this paper improve many known results, since the parametric uncertainties have been taken into account, and the derivatives of discrete and distributed time-varying delays need not to be 0 or smaller than 1. Finally, three illustrative examples are given to show the effectiveness of the proposed method.

Keywords: Robust exponential stability, impulsive stochastic neural networks, Markovian switching, Lyapunov-Krasovskii functional

Title: **New Results on Exponential Stability of Fractional Order Nonlinear Dynamic Systems**

Authors: Tianzeng Li , Yu Wang, Yong Yang

Sources: *Discontinuity, Nonlinearity and Complexity* ,5(4) (2016): 395–405 **(D)**

Abstract: In this letter stability analysis of fractional order nonlinear systems is studied. An extension of Lyapunov direct method for fractional order systems is proposed by using the properties of Mittag-Leffler function and Laplace transform. Some new sufficient conditions which ensure local exponential stability of fractional order nonlinear systems are proposed firstly. And we apply these conditions to the Riemann-Liouville fractional order systems by using fractional comparison principle. Finally, three examples are pro-vided to illustrate the validity of the proposed approach.

Keywords: Mittag-Leffler function, Nonlinear dynamic system, Fractional order, Fractional comparison principle

Title: **Further Results on the Stability of Neural Network for Solving Variational Inequalities**

Authors: Mi Zhou , Xiaolan Liu

Sources: *Discontinuity, Nonlinearity and Complexity,* 5(4) (2016): 341–353 **(D)**

Abstract: This paper analyzes and proves the global Lyapunov stability of the neural network proposed by Yashtini and Malek when the mapping is continuously differentiable and the

Jacobian matrix of the mapping is positive semi-definite. Furthermore, the neural network is shown to be exponentially stable under stronger conditions. In particular, the stability results can be applied to the stability analysis of variational inequalities with linear constraints and bounded constraints. Some examples show that the pro-posed neural network can be used to solve the various nonlinear optimization problems. The new results improve the existing ones in the literature.

Keywords: Variational inequalities, Neural network, Positive semi-definite, Continuously differentiable, Exponential stability

Title: **The existence of global weak solutions to the shallow water wave model with moderate amplitude**

Authors: Ying Wang

Sources: *Cogent Mathematics* ,(2016), 3: 1155829 **(D)**

Abstract: The existence of global weak solutions to the shallow water model with moderate amplitude, which is firstly introduced in Constantin and Lannes's work (2009), is investigated in the space $C([0,\infty)\times R)\cap L^{\infty}((0,\infty);\ H^{1}(R))$ without the sign condition on the initial value by employing the limit technique of viscous approximation. A new one-sided lower bound and the higher integrability estimate act a key role in our analysis.

Keywords: global weak solutions, viscous approximation, shallow water model