Welcome Messages

Dear colleagues,

It is our great pleasure and privilege to welcome you to the virtual edition of ACESS2022, the 2022 The International Conference on Advanced Civil Engineering and Smart Structures. The conference will be held from October 26, 2022 and is now accessible to registered participants worldwide.

On this great gathering, Organizing Committee invites participants from all over the globe to take part in this annual conference with the theme "Advanced Civil Engineering and Smart Structures". ACESS2022 aims at sharing new ideas and new technologies amongst the professionals, industrialists and students from research areas of Advanced Civil Engineering and Smart Structures to share their recent innovations and applications and indulge in interactive discussions and technical sessions at the event.

Submitted papers will be peer reviewed by conference committees, the accepted papers that presented at the conference will be included into ACESS2022 conference proceedings, and be published with " Lecture Notes in Civil Engineering".

We would like to thank and welcome everyone, and hope you will enjoy ACESS2022.

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Content

Note:

- All the participants are strongly advised to attend 10 minutes before the Webinar is start.
- Zoom ID and instructions will also be sent 2 days before the conference.
- The standard time for all programs is Beijing Time

Instructions about Oral Presentation

- Materials Provided by the Presenters: PowerPoint or PDF files
- Duration of each Presentation: Regular Oral Session: About 13 Minutes of Presentation and 2 Minutes of Q&A.

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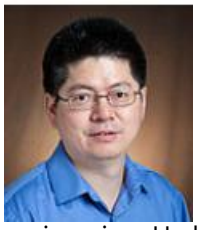
Prof. Ming Fai Chow, Monash University, Malaysia

Time Schedule (Beijing Time, GMT+8)

October 26th

08:55-9:00	Opening Speech
9:00-15:00	**Keynote & Invited Session**
9:00-9:30	**Interpretation of impedance data in hydration of cementitious materials through the distribution of relaxation time model** Prof. Mijia Yang | North Dakota State University, USA
9:30-10:00	**Recent Advances in FRP-strengthened Concrete Structures** Prof. Jian-Guo Dai| Hong Kong Polytechnic University, China
10:00-10:30	**Slope Stabilization By Tree Induced Suction** Prof. Nazri bin Ali | Universiti Teknologi Malaysia, Malaysia
10:30-11:00	**Case Studies on Rehabilitation of the Offshore Tubular Joints with Unidirectional CFRP Laminates** Prof. Hazem Samih mohamed | Southwest Petroleum University, China
11:00-11:30	**Assessing the Structural Health of the Pavement Sections using FWD Parameters** Prof. Mena I. Souliman I University of Texas at Tyler
11:30-12:00	**Numerical investigation on the failure modes of the offshore jacket platform under ship collision and the application of honeycomb reinforcement** Prof. Hong Lin I China University of Petroleum, China
12:00-13:00	**Break**
13:00-15:00	**Keynote & Invited Session**
13:00-13:30	**Lateral impact tests on precast bridge columns reinforced with hybrid ultra-high and normal strength steel bars** Prof. Zhongkui Cai I Nanjing Tech University, China
13:30-14:00	**Nature inspired protection of soil slope through vegetation: Unsaturated Soil Perspectives** Dr. Bordoloi Sanandam I Prairie Research Institute, University of Illinois at Urbana Champaign, USA
14:00-14:30	**High-performance smart pseudo-ductile composites** Asst. Prof. Dr. Mohammad Fotouhi I Delft University of Technology (TU Delft), Netherlands
14:30-15:00	**Influence of Recycled Plastic on the Thermal Transmittance and Sustainable Assessment of Concrete Mixes** Asst. Prof. Dr. Omer Damdelen I Cyprus International University, Turkey
15:00-16:30	**Oral session**
3	**The effect of multi-wall carbon nanotubes on the flexural and compressive strength of cement-based composites** Fani Gkountakou I Democritus University of Thrace, Greece
4	**Influence of Masonry Infill wall in RC Frames** Ahmad Mubarak Aliyu I Nanjing University of Science and Technology, China
AS109	**Crystal structure effect on the metallic mechanical properties of under tension stress: A molecular dynamics study** MingWang I Liaoning Technical University, China
AS115	**Estimating bridge modal parameters from the responses of three-connected vehicles** Yi He I Chongqing University, China
7	**Energy saving architecture: concept and design practice of transforming buildings thermal envelope from parallelepiped to virtual sphere** Dr. Boronbaev Erkin I Kyrgyz State Technical University named after I. Razzakov
5	**The Damage Identification in Bridges Based on WPECD Transform** Wael A. Altabey I Alexandria University, Egypt
AS116	**Analysis of Instantaneous Frequency for Structure Condition Tracking Using Time-Frequency Representation: Comparative study** Wael A. Altabey I Alexandria University, Egypt
2	**Structural and Environmental Comparison of a Reinforced Concrete Sructure** J.Los-Santos I University of La Rioja, Spain

Keynote & Invited Speakers



Assoc. Prof. Mijia Yang
North Dakota State University, USA
Speech Title: Interpretation of impedance data in hydration of cementitious materials through the distribution of relaxation time model

Dr. Yang has practiced teaching and research broadly in structural engineering. He has taught Steel Design, Dynamic of Structures, and several others for the last 5 years. His research concentrates on impact and blast protection with advanced engineering materials, multi-scale modeling of composite and concrete materials, smart health monitoring in Civil Infrastructure, and self-healing concrete. His representative work included developing a systematic design method for impact barriers, a unified fatigue criterion for uniaxial Polyurethane E-Glass composite laminates, damage detection through guided wave, and a creep design methodology for Epoxy bonded anchor systems. Dr. Yang has participated in several state and national projects during his career, including "Effect of intermediate diaphragms on prestressed concrete bridge girders for over-height truck impacts" and "Testing of window connections specially designed for blast loading". Dr. Yang also won several national and international awards, including the Philip E. Rollhaus, Jr. Roadway Safety Essay Contest held by Quixote in 2005, the faculty research award at the University of Texas at San Antonio in 2007, the ASCE travel award in 2005, and the ASCE Journal of Aerospace Engineering Outstanding Reviewer award in 2012. Dr. Yang is currently serving as the associate editor of Journal of Materials in Civil Engineering, ASCE, and has more than 100 publications, including journal papers, conference papers, and reports in the field of composites, structural testing and characterization.

Prof. Prof. Jian-Guo Dai
Hong Kong Polytechnic University, China
Speech Title: Recent Advances in FRP-strengthened Concrete Structures

Prof. Dai is currently a full Professor at Department of Civil and Environmental Engineering, The Hong Kong Polytechnic University. He graduated with his PhD degree from Hokkaido University, Japan. His research theme is "Emerging materials and structural systems for sustainable concrete infrastructures". He has received many academic awards for his research work, including the Best Basic Research Paper Award from ASCE, Journal of Composites for Construction, Distinguished Young Scholar Award from Association of FRP for Construction, China Civil Engineering Society, "Structural Excellence Award--Grand Award R&D Award" from Hong Kong Institution of Engineers and "Outstanding International Collaboration Award" from Japan Society of Civil Engineers. He is a contributor of more than 300 technical papers (including some 170 SCI journal papers), with more than 5400 citations and h-index = 42 at Web of Science. Prof Dai is the Committee Manager of ISO/TC71 SC6 "Non-traditional Reinforcing Materials for Concrete Structures" and Vice President of International Institution of FRP for Construction (IIFC). He is a Fellow of IIFC, Hong Kong Institution of Engineers (HKIE) and Hong Kong Concrete Institute (HKCI). He is an Associate Editor of "Advanced Concrete Technology" and "Frontiers in Materials" and Vice Editor-in-Chief of "Journal of Asian Concrete Federation" and has served other journals (e.g., Advances in Structural Engineering, ASCE Journal of Materials in Civil Engineering, Construction and Building Materials) as an Editor or Guest Editor, and more than 80 international journals as a referee. He was listed as World's Top 2% Scientists by Stanford in "Civil Engineering" and "Materials Science" in 2021 and 2022.

Prof. Nazri bin Ali
Universiti Teknologi Malaysia, Malaysia
Speech Title: Slope Stabilization By Tree Induced Suction

Prof. Nazri bin Ali gained his PhD studies (2003-2007) at the Cardiff University, United Kingdom which is among the best civil engineering school in the world and obtained master and bachelor degree at Universiti Teknologi Malaysia. He is attached with the Department of Geotechnics and Transportation where he has taught core courses such as Geotechnic 1, Geotechnic 2, Soil Mechanic and Geotechnical Engineering Laboratory at undergraduate levels. He has been appointed to hold few posts in the faculty since his service at UTM. Among them, he was the Space Coordinator, FKA from 2010 until 2012. He was then again appointed as the Head of Postgraduate Studies, FKA (later change to Postgraduate Manager in Oct 2012) from Apr 2012 until now. He has involved in 19 research projects amounted more than RM 1 million associated with geotechnical engineering fields and lead 9 of them. Besides obtaining grants from the UTM such as GUP, he also participate in research teams from other universities such as UNIMAP and UMP of which the grants were funded by MOSTI through ERGS and FRGS.

Assoc. Prof. Hazem Samih mohamed
Southwest Petroleum University, China
Speech Title: Case Studies on Rehabilitation of the Offshore Tubular Joints with Unidirectional CFRP Laminates

Assoc. Prof. Hazem Samih Mohamed (HS Mohamed), Egyptian, focuses on steel structures and offshore structures. He completed his Ph. D. degree at Huazhong University of Science and Technology. Afterward, he was selected as a distinguished young Assoc. professor at the School of Civil Engineering Geomatics of Southwest Petroleum University. He had conducted several research works on the Fatigue assessment of offshore platforms, bearing capacity of the corroded offshore platforms, and rehabilitation of the corroded/uncorroded offshore platforms using CFRP laminates. He has published several peer-reviewed scientific papers in well-recognized top journals, such as Construction and Building Material; Marine structures; Ocean Engineering; Thin-walled Structures; Journal of Constructional Steel Research; and Engineering Failure Analysis.

Assoc. Prof. Mena I. Souliman
University of Texas at Tyler, USA
Speech Title: Assessing the Structural Health of the Pavement Sections using FWD Parameters

Dr. Souliman is an Associate Professor in Civil Engineering at the University of Texas at Tyler. He received his M.S. and Ph.D. from Arizona State University in Civil, Environmental, and Sustainable Engineering focusing on Pavement Engineering. His twelve years of experience are concentrated on pavement materials design, Fatigue Endurance Limit of Asphalt Mixtures, Reclaimed Asphalt Pavement (RAP) mixtures, aggregate quality, field performance evaluation, maintenance and rehabilitation techniques, pavement management systems, cement treated bases, statistical analyses, modeling, and computer applications in civil engineering. He has more than 100 technical publications, conference papers and reports in the field of pavement and aggregate testing, characterization, and field monitoring. He is the recipient of the lifetime International Road Federation Fellowship in 2009. In 2017, his research work on pavement engineering-related projects earned recognition as his college's recipient of the Crystal Talon Award, sponsored by the Robert R. Muntz Library, recognizing outstanding scholarship and creativity of faculty from each college as determined by their dean. He also was awarded with the Crystal Quill award in 2018 by the University of Texas at Tyler for his research efforts and achievements.

Assoc. Prof. Hong Lin
China University of Petroleum, China
Speech Title: Numerical investigationonthe failure modesofthe offshore jacket platform under ship collisionand the applicationof honeycomb reinforcement

Hong LIN, PhD, the Associate Professor in College of pipeline and civil engineering, China University of Petroleum (East China). She has been doing researches in the broad field of structural engineering, her expertise are: Structural response and damage analysis, Fire & explosion dynamics, Numerical simulation, Safety evaluation and reliability analysis. Up to now, she has conducted more than 10 research projects as the leader, including 3 natiqonal projects supported by NSFC (National Natural Science Foundation of China), including “Assessment of disaster resistance ability and risk evolution of offshore oil platforms under accidental events”, “Study on the evolution of seismic damage scenarios and limit state of offshore platforms”, et al. Currently, she is serving as the Youth Editorial Board Member of Journal of China University of Petroleum (Ed. of Natural Sciences), Chinese Journal of Applied Mechanics, and Journal of China Offshore Platform. So far, she has published more than 30 articles in high-ranked international journals, such as Process Safety and Environmental Protection; Journal of Loss Prevention in the Process Industries; Journal of marine science and engineering; Petroleum Exploration and Development; and Journal of Constructional Steel Research. In 2021, she won the award of National Xu Zhilun Outstanding Mechanics Teacher.

Assoc. Prof. Zhongkui CAI
Nanjing Tech University, China
Speech Title: Lateral impact tests on precast bridge columns reinforced with hybrid ultra-high and normal strength steel bars

Assoc. Prof. Zhong-Kui Cai achieved his doctoral degree from Harbin Institute of Technology, China in 2018. He is the head of the Department of Disaster Prevention and Mitigation, College of Civil Engineering, Nanjing Tech University. He has been the project technical consultant of China Construction Third Engineering Bureau Co. Ltd, the committee manager of the Composite Society of Jiangsu Province, and the committee member of the Dynamic Mechanics and Control Society of Jiangsu Province. His research concentrates on improving structural resilience through innovative structures and advanced analytical methods. Dr. Cai has published almost 30 papers as the first or corresponding author in many high-ranked international journals, including the Journal of Composites for Construction-ASCE, Engineering Structures, and Composite Structures. He leads and participates in 4 research projects granted by the National Natural Science Foundation of China, and finished 2 government entrusted research projects from the Ministry of Housing and Urban-Rural Development of China. He has received 2 national and 1 provincial academic awards, including China Industry-Education-Research Cooperation Award in 2022, China Jianhua Project Award in 2021, and the Excellent works Award of Jiangsu Province Science Communication Center in 2020.

Asst. Prof. Dr. Omer Damdelen
Cyprus International University, Turkey
Speech Title: Influence of Recycled Plastic on the Thermal Transmittance and Sustainable Assessment of Concrete Mixes

Dr. Omer DAMDELEN is a self-motivated, ambitious and high achieving civil engineer, he got his PHD degree in Kingston University. Now he is an Assistant Professor in Civil Engineering Department at Cyprus International University, Turkey. His research concentrates on sustainable concrete construction, thermal mass, energy efficiency and CO2 emissions. He has published more than 30 papers in international conference and journal (SCI & SSCI), such as The Journal of Materials research and technology (IF 6.267), and Construction and Building Materials (IF 7.693).

Asst. Prof. Dr. Mohammad Fotouhi
Southeast University, China
Speech Title:High-performance smart pseudo-ductile composites

Dr. Mohammad Fotouhi is Assitant Professor at Civil Engineering and Geosciences, The Delft University of Technology (TU Delft), Netherlands. research focuses on the development of structural health monitoring techniques for engineering structures. This involves the development of sensor nodes that are cheap, low-power, and reliable. Furthermore, the focus is on the development of lightweight/smart bio-inspired structures, 4D printed self-morphing structures and multi-functional materials. The techniques are applied to develop materials that are light-weight, more durable, sustainable, and self-sensing.

Dr. Sanandam Bordoloi
Prairie Research Institute, University of Illinois at Urbana Champaign, United States
Speech Title: Nature inspired protection of soil slope through vegetation: Unsaturated Soil Perspectives

Dr. Sanandam Bordoloi is a Post-Doctoral Research Associate at the Prairie Research Institute, University of Illinois at Urbana Champaign, United States. Formerly, He was a post-doctoral fellow at HKUST in the Department of Civil and Environmental Engineering. He was conferred the doctorate degree from the Indian Institute of Technology Guwahati (IITG), India in July 2019. He learned about the Youth Editor position in your journal from a personal mail sent by the journal website. He would like to put my case for the position, based on the requirements and desired skills outlined in the job posting. His research experience to date has resulted in 50 accepted SCI/Scopus journals. He have also co-authored 3 patents and 3 book chapters during my PhD tenure. He have assisted his thesis supervisor and collaborators in developing 2 national research grant proposals. Furthermore, he have co-supervised more than 20 students (Undergraduate (UG) and Postgraduate (PG)) with published research outputs. He have been able to develop research collaboration with faculties from different disciplines and universities with joint journal publication.

Oral Session

Paper ID: 2
Title: Structural and Environmental Comparison of a Reinforced Concrete Sructure
Abstract:
This document refers to the modelling of an office building trough a reinforced concrete structure. For this purpose, several alternatives were generated by modifying structural parameters such as floor slab typology, distance between pillars, material of the vaults. The methodology used was through a specific structural calculation program such as CYPE, in which reinforced concrete and metallic structures can be modelled. Subsequently, environmental studies were obtained from the various alternatives generated through the life cycle analysis (LCA) of each alternative. The field of study of the LCA went from the production of the necessary elements to their implementation in the structure. In this way, it is possible to give the project a more global image of the impacts it generates, not only in economic but also in environmental terms. Some of the results obtained show that the use of a type of floor slab with certain characteristics compared to another type of floor slab represents an increase of approximately 17% in the kg of CO2 equivalent emitted. As a result, alternatives with more environmentally friendly characteristics are obtained.

Paper ID: 3
Title: The effect of multi-wall carbon nanotubes on the flexural and compressive strength of cement-based composites
Abstract:
Nanoparticles are characterized as the most frequently used materials for enhancing the mechanical properties of nano-modified composites. The combination of cement-based materials with nanomaterials is important for embellishing the microstructural characteristics of cementitious materials and filling voids in the cement pastes. Recently, many studies on incorporating carbon nanotubes in cement paste showed an improvement in the engineering field. In this research, many three-point bending tests into prismatic specimens that were cast into 40 mm x 40 mm x 160 mm size molds were conducted to examine the mechanical characteristics of multi-wall carbon nanotubes (MWCNTs). More specifically, in order to create cement paste enhanced with MWCNTs, three different amounts of MWCNTs, such as 0.1 wt.%, 0.2 wt.%, and 1.0 wt.% by the mass of cement were used. Sonication energy and surfactants were applied in order to disperse the MWCNTs into the aqueous solution. By evaluating the results, it was concluded that the amount of 0.1 wt.% MWCNTs revealed the highest 28-day compressive (55.5 MPa) and flexural (6.9 MPa) strength compared to the other samples. Thus, MWCNTs are capable of creating cement-based materials with multiple structural functions.

Paper ID: 4
Title: Influence of Masonry Infill wall in RC Frames
Abstract:
The function of infilled masonry reinforced concrete (RC) frame buildings during severe events such as blast caused by explosions or earth movement – earthquake and other significant lateral displacement could seriously damage a supporting frame column, causing the frame to collapse completely or partially. The behavior of a framed structure associated with loss of supporting column as a result of vertical gravitational loading imbalance has received less attention in recent studies. When a supporting column is removed in a framed structure, it is assumed that the member deflection increases significantly, which could be restrained by the infill wall, resulting in contact forces between the infill wall and the frame. These interaction forces have an impact on the distributions of shear forces and bending moments along the frame components, which can contribute to frame stability or failure. The current study aims to address these key issues and gain insight into the performance of infilled-frame activity in the absence of a peripheral supporting column. This study's methodology is based on a numerical investigation of a typical RC infilled-frame subjected to gravitational loading using the three-dimensional discrete element code (3DEC) model. The scenarios considered include; investigation of the loaded structure with the column in place, without the column in place but supported by an infilled wall and with the effect of lateral load acting on the structure without a peripheral column support. The results indicate that masonry infill walls considerably increase the frame resistance to vertical load action, compared to the resistance of a bare frame up to 18%, therefore, the infill wall could play a major role in maintaining the structural system's stability/integrity and reducing the likelihood of a progressive collapse.

Paper ID: AS109

Title: Crystal structure effect on the metallic mechanical properties of under tension stress: A molecular dynamics study

Abstract:

In this paper, the tensile mechanical properties and deformation behavior with different crystal structures (face-centered cubic (FCC) metal ~Al and closely packed hexagonal (HCP) metal ~Ti) were studied using molecular dynamics calculation through the LAMMPS module of Materials And Processes Simulations (MAPS) software, and the effect of microstructure on their mechanical properties was explored from the atomic level. The simulation results showed that the elastic modulus and the tensile strength of Al was calculated with 45.0 GPa and 6.2 GPa, respectively, and the elastic modulus and the tensile strength of Ti was calculated with 73.1 GPa and 8.5 GPa, respectively. According to calculation with Ovite, the lattice of HCP structure (~Ti) can accumulate higher strain energy and have greater deformation resistance ability than that of FCC structure (~Al), which was the reason for the elastic modulus and tensile strength of Ti were higher than those of Al.

Paper ID: AS115

Title: Estimating bridge modal parameters from the responses of three connected vehicles

Abstract:

Vehicle scanning method is an indirect method that senses bridge's state from moving vehicles. However, pavement roughness often seriously contaminates the information of bridge contained in vehicle responses. In this study, using any of two contact residual responses of three-connected moving vehicles to extract bridge modal parameters is proposed. The contact-point accelerations are back-calculated from the vertical accelerations of three vehicles, from which the pavement roughness-related frequencies can be massively eliminated in the two contact residual responses. The bridge frequencies are identified from the FFT spectrum while the damping ratios are estimated by curve fitting of the free-decay components extracted by Random Decrement Technique (RDT) and Variational Mode Decomposition (VMD). As the two contact residual accelerations can be expressed as the interpolation of mode shapes, the mode shapes of a bridge can be retrieved by the residual response matrix using singular value decomposition. To recover the incomplete measured data in retrieving the mode shapes, the Singular Value Thresholding is adopted. The effectiveness and robustness of the proposed method are validated by numerical examples considering a wide range of practical conditions.

Paper ID: 7

Title: Energy saving architecture: concept and design practice of transforming buildings thermal envelope from parallelepiped to virtual sphere

Abstract:

Based on the author's theory of energy-saving architecture, this article for the first time presents the concept and design practice of transforming the thermal envelope of low-rise residential buildings from parallelepiped to virtual sphere. This architecture is designed to harmonize the daily, seasonal, and annual dynamics of the building's interaction with renewable energies of the environment (outdoor air, ground, wind, sky, surfaces facing the building) and incoming solar radiation. The thermodynamically ideal spherical building serves as a basis for comparative evaluation and improvement of entire buildings. The goal is a multidisciplinary achievement of the normative parameters of the building's microclimate ensuring its energy efficiency and seismic resistance while preventing the thermal bridge's effect and mold growth. Based on the author's definition and classification of thermal bridges, an additional layer of external thermal insulation of the zones of architectural and structural thermal bridges was adopted. The required thickness of this layer is taken when the inner surface temperature of these zones becomes equal to the temperature on the main inner surface of the outdoor enclosures. This investigation method was implemented by visual representation of isotherms and heat flux density in the enclosures coupling zone cross sections using the ArchiCAD20 software package. Additional thermal insulation was applied on: semi-basement's floor and concrete foundation; coupling zones of seismic columns and crossbars, and inter and upper floors to brick walls. For parallelepiped-shaped brick buildings with a seismic-resistant reinforced concrete frame, their thermal envelope has been transformed into a virtual cylinder; virtual national Kyrgyz yurt; virtual sphere. Practical recommendations for such design have been developed.

Paper ID: 5
Title: The Damage Identification in Bridges Based on WPECD Transform
Abstract:

In this work, the numerical and experimental verifications used to ver-ify the effectiveness of the wavelet packet energy curvature difference (WPECD) method in identifying structural damage, the beam body replaced by the bridge model is used to simulate the two damage levels. The acceleration response of each point in intact and damaged states was tested, and the WPECD method was used to identify the damage, and the influence of the wavelet function and the number of decomposition layers on the identification effect was investigated Knot. The results show that the method is effective and can be applied to practical engineering.

Paper ID: AS116
Title: Analysis of Instantaneous Frequency for Structure Condition Tracking Using Time-Frequency Representation: Comparative study
Abstract:

Damage causes the dynamic structural responses of civil engineering structures to change from linear to nonlinear. It can be challenging to break down signals and identify features, mainly when the data is generated by a nonlinear system and is nonstationary. Under heavy loads and during routine operations, civil structures have been seen to exhibit nonlinear dynamic characteristics. To assess progressive damage, it is necessary to characterize the time-varying attribute of the structure's nonlinearity and consider how the frequency and amplitude contents of nonstationary vibration responses change over time. The properties of a nonstationary signal cannot be properly described by either time analysis or frequency analysis alone. When measured data include structural damage occurrences, it is critical to extract as much information about the damage as possible from the data. To create a reliable damage detection method that captures damage progression using vibration data gathered by sensors, this work examines the instantaneous frequency representation utilizing time-frequency distributions of the energy density domain. The results are validated using various experimental and numerical simulations. The ideal instantaneous frequency presentation is chosen as a criterion for comparing various distributions. The Wigner distribution is proven to be the best among them in terms of this criterion, although all regularly used distributions have artifacts along the frequency axis.