



# 2021 PSS®CAPE Virtual User Group Meeting & Conference *September 13 - 30*

Event Guide

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# | Overview

## Overview

### 2021 PSS®CAPE Virtual UGM & Conference


**Dates:** Monday, September 13 – Thursday, September 30  
**Cost:** Protection Seminar and UGM – free for PSS®CAPE users under maintenance  
Training – US\$350 for each 4-hour session; US\$300 for registration by August 27  
**CEU/PDH:** All sessions are eligible for CEU/PDH credits.

Expand your knowledge of system protection, learn the latest about PSS®CAPE, and guide future development with our 2021 PSS®CAPE Virtual User Group Meeting & Conference.

This year's sessions will again be held virtually over nearly 3 weeks, starting on September 13 with our half-day protection seminar on Monday and four half-day UGM sessions on Tuesday through Friday. Our training will start on Monday, September 20 and extend through Thursday, September 30, with two half-day sessions being held every weekday. All sessions are open to PSS®CAPE users currently under maintenance and eligible for CEU/PDH credits.

**The Protection Seminar and UGM are under one registration** and again provided free of charge this year.

**Training is available through a separate registration** and offered at US\$350 per 4-hour session or at a discounted \$300 for registrations received by August 27.



Register now for  
Seminar & UGM

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Training

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# Event Schedule

## 2021 PSS@CAPE Virtual UGM & Conference

**September 2021**

SUN	MON	TUES	WED	THURS	FRI	SAT
12	13 Protection Seminar 11:00 am – 3:00 pm EDT	14 PSS@CAPE UGM 11:00 am – 3:00 pm EDT	15 PSS@CAPE UGM 11:00 am – 3:00 pm EDT	16 PSS@CAPE UGM 11:00 am – 3:00 pm EDT	17 PSS@CAPE UGM 11:00 am – 3:00 pm EDT	18
19	20 Training 8:00 am - 12:00 noon EDT 1:00 pm - 5:00 pm EDT	21 Training 8:00 am - 12:00 noon EDT 1:00 pm - 5:00 pm EDT	22 Training 8:00 am - 12:00 noon EDT 1:00 pm - 5:00 pm EDT	23 Training 8:00 am - 12:00 noon EDT 1:00 pm - 5:00 pm EDT	24 Training 8:00 am - 12:00 noon EDT 1:00 pm - 5:00 pm EDT	25
26	27 Training 8:00 am - 12:00 noon EDT 1:00 pm - 5:00 pm EDT	28 Training 8:00 am - 12:00 noon EDT 1:00 pm - 5:00 pm EDT	29 Training 8:00 am - 12:00 noon EDT 1:00 pm - 5:00 pm EDT	30 Training 8:00 am - 12:00 noon EDT	1	2

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EDT = UTC -4

<b>Color Key:</b>	Protection Seminar	PSS@CAPE UGM	Training
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# | Protection Seminar

# Impact of Renewable Energy Resources on System Protection

Presented by Aboutaleb Haddadi and Evangelos Farantatos

This year's professional seminar will be presented by two experts in our profession:

## Aboutaleb Haddadi, B.Sc., M. Sc., Ph.D.

Senior Engineer Scientist with the Grid Operations and Planning R&D Group at EPRI, Knoxville, TN

Aboutaleb Haddadi received his B.Sc. and M.Sc. degrees in electrical engineering from Sharif University of Technology, Tehran, Iran in 2007 and 2009, respectively, and his Ph.D. degree in electrical engineering from McGill University, Montreal, Canada in 2015.

Aboutaleb is a Senior Engineer Scientist with the Grid Operations and Planning R&D Group at EPRI, Knoxville, TN. His work focuses on renewables grid integration studies, transmission system protection and the impact of renewables, and power system modeling and simulation. Aboutaleb is also the chair of CIGRE Working Group C4.60 on Generic EMT Modeling of Inverter-Based Resources.

## Evangelos Farantatos, M.S., Ph.D.

Senior Project Manager with Grid Operations and Planning R&D Group at EPRI, Palo Alto, CA

Evangelos received his undergraduate degree in electrical and computer engineering from National Technical University of Athens, Greece, in 2006, and M.S. and Ph.D. degrees from Georgia Institute of Technology, Atlanta, Georgia, USA, in 2009 and 2012, respectively.

Evangelos is managing and leading the technical work of various R&D projects related to synchro-phasor technology, power systems monitoring and control, power systems stability and dynamics, renewable energy resources modeling, and grid operation and protection with high levels of inverter-based resources. In addition, he is a Senior Member of IEEE.

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# Impact of Renewable Energy Resources on System Protection

## Seminar Abstract

*Renewable energy resources such as wind turbine generators and solar photovoltaic inverters exhibit different fault current characteristics compared to traditional synchronous generators (SGs). Hence, increased uptake of renewables in the power system is expected to impact the performance of traditional protective relay schemes—set under the assumption of a SG-dominated power system. Protection engineers need to study these challenges and develop remedial solutions ensuring the effectiveness of system protection under higher levels of renewables.*

This seminar studies the impact of renewables on a variety of protective relay schemes including:

- line distance protection,
- negative sequence quantities-based protection elements,
- line current differential protection, phase comparison protection, power swing protection,
- Rate-Of-Change-Of-Frequency (ROCOF) protection, and
- memory-polarized protective relay elements.

For each protection function, potential misoperation scenarios are identified, and recommendations are suggested to address the misoperation issue. The objective is to provide an improved understanding of the way renewables may negatively impact the performance of traditional protection schemes as a first step towards developing future remedial solutions ensuring effective protection under high share of renewables.

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# Impact of Renewable Energy Resources on System Protection

## Seminar Agenda

**Date/Time:** Monday, September 13, 11:00 am – 3:00 pm EDT (UTC -4)

**Cost:** No charge for PSS@CAPE customers currently under maintenance.

**CEU/PDH:** This 4-hour session is eligible for 0.40 CEUs or 4 PDHs.

- Fault current response of renewables
- Review of impact of renewables on system protection
  - Line distance protection
  - Negative sequence quantities-based protection elements
  - Line current differential protection
  - Phase comparison protection
  - Power swing protection
  - Rate-Of-Change-Of-Frequency (ROCOF) protection
  - Memory-polarized protective relay elements
- Recommendations

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# PSS<sup>®</sup>CAPE

# User Group Meeting

# PSS<sup>®</sup>CAPE User Group Meeting

Presented by the PSS<sup>®</sup>CAPE Team and PSS<sup>®</sup>CAPE Users

**Date/Time:** Tuesday, September 14 – Friday, September 17, 11:00 am – 3:00 pm EDT (UTC -4)

**Cost:** No charge for PSS<sup>®</sup>CAPE customers currently under maintenance.

**CEU/PDH:** This 4-day series is eligible for a total of 1.60 CEUs or 16 PDHs (0.40 CEUs or 4 PDHs per 4-hour session).

The PSS<sup>®</sup>CAPE Team has been developing serious new tools that will let PSS<sup>®</sup>CAPE do more for you and will help you with more of the real-world problems you face daily. Topics for this year include:

- Compliance module updates
- Status of the PSS<sup>®</sup>CAPE rewrite effort and plans for release
- Inverter-based resources (IBR) modeling improvements
- Upcoming PSS<sup>®</sup>CAPE developments
  - PowerBase connection for relay settings exchange
  - Move to MS SQL server
- Customer and industry presentations
- Improved program features and new macros
- Latest and greatest relay models

*In addition, we want to hear your ideas on how you would like to see PSS<sup>®</sup>CAPE evolve in the future!*

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# | Training

# PSS®CAPE Virtual Training

Presented by the PSS®CAPE Team

**Date/Time:** Monday, September 20 – Thursday, September 30  
4-hour weekday sessions from 8:00 am – 12:00 noon EDT and 1:00 pm – 5:00 pm EDT (UTC -4)

**Cost:** US\$350 per 4-hour session; discounted US\$300 for registration by August 27  
Upon approval of your registration, you will receive a separate email with details on submitting payment.

**CEU/PDH:** Each 4-hour session is eligible for 0.40 CEUs or 4 PDHs.

These economical training classes are a great way for current users to extend their PSS®CAPE skills and for new users to get the “big picture” quickly.

With 16 course offerings including new and updated classes, every level of user has a wealth of options. Review our [Class Schedule](#) slide for session offerings and find details on each class in the [PSS®CAPE UGM Training Course Outlines](#).

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# PSS®CAPE Virtual Training

## Class Schedule

### September 2021

SUN	MON	TUES	WED	THURS	FRI	SAT
19	20	21	22	23	24	25
	<b>PSS®CAPE for New Users - Part 1*</b> 8:00 am - 12:00 noon EDT	<b>Coordination Graphics</b> 8:00 am - 12:00 noon EDT	<b>NERC Compliance for PRC-019, 023, 024 &amp; 025</b> 8:00 am - 12:00 noon EDT	<b>NERC PRC-027 and the Compliance Module</b> 8:00 am - 12:00 noon EDT	<b>SQL Introduction</b> 8:00 am - 12:00 noon EDT	
	<b>PSS®CAPE for New Users - Part 2*</b> 1:00 pm - 5:00 pm EDT	<b>System Simulator &amp; Sensitivity and Coordination Macros</b> 1:00 pm - 5:00 pm EDT	<b>NERC PRC-026 Compliance and PSS®CAPE-TS Link™</b> 1:00 pm - 5:00 pm EDT	<b>Managing &amp; Merging Data</b> 1:00 pm - 5:00 pm EDT	<b>Short-Circuit Modeling of Inverter-Based Resources</b> 1:00 pm - 5:00 pm EDT	
26	27	28	29	30	1	2
	<b>Relay Setting</b> 8:00 am - 12:00 noon EDT	<b>Macros - Beginner</b> 8:00 am - 12:00 noon EDT	<b>Breaker Duty Analysis</b> 8:00 am - 12:00 noon EDT	<b>Transformer Modeling and Neutral Nodes</b> 8:00 am - 12:00 noon EDT		
	<b>Modeling Detailed Bus Structures and Open-Ended Lines</b> 1:00 pm - 5:00 pm EDT	<b>Macros - Advanced</b> 1:00 pm - 5:00 pm EDT	<b>Line Constants for Modeling Transmission Lines and Calculating Line Parameters</b> 1:00 pm - 5:00 pm EDT			

EDT = UTC -4

\*PSS®CAPE for New Users is an 8-hour class and includes instruction on Database Editor, One-Line Diagram, Short Circuit and Protection Modeling.

<b>Color Key:</b>	<b>NEW in 2021</b>	<b>UPDATED in 2021</b>	<b>NEW in 2020</b>	<b>UPDATED in 2020</b>
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