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# Tributes to Our Friends in the Steering Committee in Relay Form: Their Technical Achievements

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Maria Teresa Correia de Barros, Carlo Alberto Nucci  
Taku Noda, Jean Mahseredjian, Ani Gole  
Stephan Pack and Hans Hoidalén

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## Tributes in Relay Form

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- ◆ Words from the IPST Steering Committee Chairpersons  
    Maria Teresa Correia de Barros and Carlo Alberto Nucci
- ◆ Early Days of Prof. Ametani's Research  
    Taku Noda
- ◆ Prof. Ametani's Work in Montreal  
    Jean Mahseredjian
- ◆ Prof. Ametani's Work in Winnipeg  
    Ani Gole
- ◆ Prikler's Work in the EMT Research  
    Stephan Pack and Hans Hoidalén

## Prof. Akihiro Ametani and Laszlo Prikler



Photo from IPST 1997 in Seattle

**Prof. Akihiro Ametani** (left)  
passed away on Jan. 4, 2022.  
Doshisha University  
(Kyoto, Japan)  
SC Co-Chairperson (2015-2022)  
SC Member (1995-2015)  
2003 TC Chairperson  
2009 LOC Chairperson

**Laszlo Prikler** (right)  
passed away on Mar. 30, 2021.  
Technical University of Budapest  
(Budapest, Hungary)  
SC Member (1995-2021)  
1999 LOC Chairperson  
2005 TC Chairperson



Photo from IPST 2007 in Lyon



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# Early Days of Prof. Ametani's Research in Kyoto, Manchester and Portland

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Taku Noda

Secretary, IPST Steering Committee  
Co-Chairperson, IPST 2023 Technical Committee  
Central Research Institute of Electric Power Industry

## Overview

- ◆ Prof. Akihiro Ametani was born in Nagasaki, Japan on February 14, 1944.
- ◆ He obtained his Bachelor's degree in Electronics in 1966 and his Master's degree in Electrical Engineering in 1968 from Doshisha University, Kyoto.
- ◆ He obtained his PhD degree from the University of Manchester Institute of Science and Technology (UMIST), Manchester, UK in 1973, under the supervision of Prof. Martin Wedepohl. (Doctor of Eng. in 2010)
- ◆ From 1976 to 1981, he was also a scientist at Bonneville Power Administration, Department of Energy, Portland, OR, USA.
- ◆ He became Lecturer, Associate and Full Professor at Doshisha University. He was Dean of the Science and Technology Research Institute (1996-1997) and the Academic Information Center (1998-2001) and also held positions at KU Leuven, Waseda University and National Univ. of Ireland.

## Three Major Research Areas

1. Frequency-dependent parameter calculations of overhead and underground-cable transmission lines. Especially, the systematic calculation methodology used in Cable Constants in EMTP is notable.
2. Application of the Fast Fourier Transform (FFT) algorithm to calculate transients of electrical circuits by numerical inversion of frequency response.
3. Calculation methods for frequency-dependent transmission-line models. Ametani Setup in BPA's EMTP and the Refraction Coefficient method.

In addition,

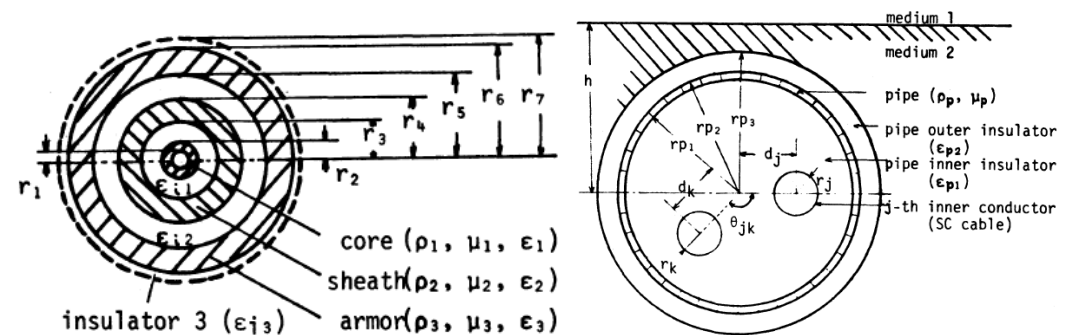
- ◆ He proposed a method to reduce harmonics produced by thyristor-based ac/dc converters. It is considered a pioneering work in the area of active filters by the IEEE PES.

# 1. Frequency-Dependent Parameter Calculations

- ◆ The paper shows how to calculate the parameters of underground cables in a systematic way:

A. Ametani, "A General Formulation of Impedance and Admittance of Cables," IEEE Trans. on Power App. and Systems, vol. PAS-99, no. 3, pp. 902-910, May 1980, doi: 10.1109/TPAS.1980.319718.

- ◆ The result was implemented as the Cable Constants supporting routine of BPA's EMTP.
- ◆ Since Cable Constants was able to calculate the parameters of most of existing cables, it has become the standard program not only in research but also in practical simulations.
- ◆ Important papers also on the calculation of the earth-return impedance for stratified cases.



## 2. Application of FFT to Electrical Transients

- ◆ This break-through paper makes possible to apply the FFT algorithm to electrical transients even when the integration path is shifted (Laplace).

A. Ametani, "The Application of the Fast Fourier Transform to Electrical Transient Phenomena," International Journal of Electrical Engineering & Education, Vol. 10(4), pp. 277-287, 1973.

- ◆ This led to the development of a general program:

N. Nagaoka and A. Ametani, "A development of a generalized frequency-domain transient program-FTP," IEEE Trans. on Power Delivery, vol. 3, no. 4, pp. 1996-2004, Oct. 1988, doi: 10.1109/61.194010.

- ◆ And research work by other groups.

### The Application of the Fast Fourier Transform to Electrical Transient Phenomena

A. AMETANI

Department of Electrical Engineering and Electronics, University of Manchester, Institute of Science and Technology, England

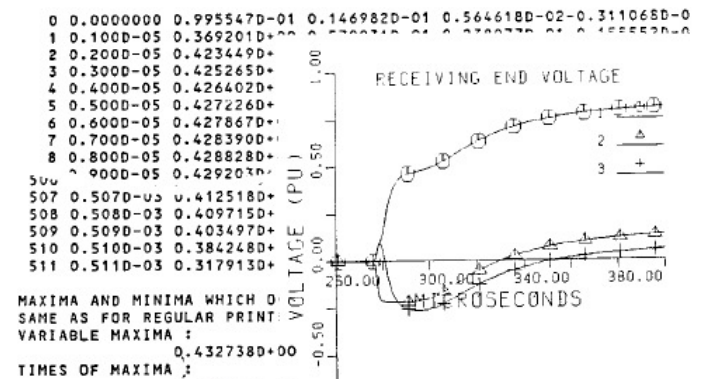
#### List of Principal Symbols

$F$  = series of frequency samples

$f$  = series of time responses inverted from  $F$

$N$  = number of frequency samples = number of time responses

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## 3. Frequency-Dependent Transmission-Line Models

### ◆ Ametani Setup in BPA's EMTP - Linear approximation:

A. Ametani, "A highly efficient method for calculating transmission line transients," IEEE Trans. on Power App. and Systems, vol. 95, no. 5, pp. 1545-1551, Sep. 1976, doi: 10.1109/T-PAS.1976.32253.

### ◆ The Refraction Coefficient method calculates transients in power systems based the refraction coefficients of TLs and distributed approximations of lumped elements:

A. Ametani, "Refraction coefficient method for switching surge calculations on untransposed transmission lines," IEEE Power Engineering Society 1973 Summer Meeting, Paper # C73-444-7.

The subject of the paper is the same as that of his PhD thesis. It is a pity that the paper was not published as a transactions paper due to an office-work problem.

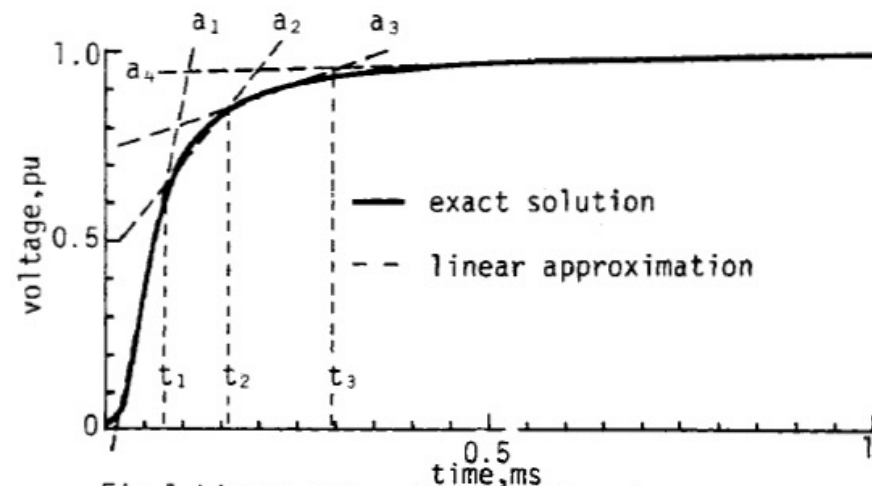
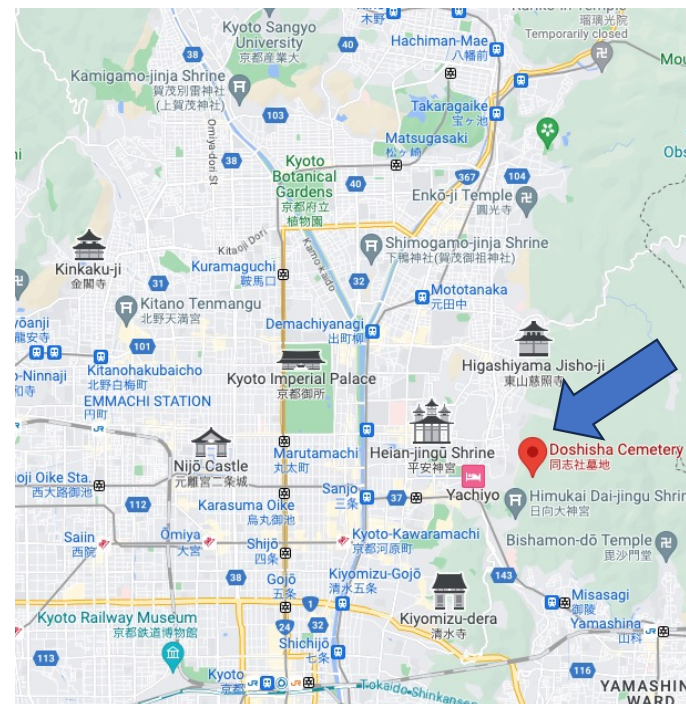


Fig.1 Linear approximation of a step response on a single-phase line

# Now, Prof. Ametani's Soul Rests in Peace with

- ◆ Joseph Hardy Neesima who established Doshisha University (see Wiki).



Google Maps  
The City of Kyoto

FYI: The Akihiro Ametani Award has been established by the IET Japan Local Network.



# Prof. Ametani's Work in Montreal

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Jean Mahseredjian  
Member, IPST Steering Committee  
Polytechnique Montréal

- As an invited professor, Prof. Ametani was in the Department of Electrical Engineering at Polytechnique Montréal between 2014 and 2018.
- During these five years, Prof. Ametani participated intensively in the NSERC Industrial Research Chair named “Multi-Time-Frame Simulation of Transients for Large-Scale Power Systems”, of Prof. Jean Mahseredjian.
- He has successfully supervised 3 Ph.D. students and 1 MS student together with Professors Mahseredjian, Correia de Barros and Kocar.
- A total of 28 papers have been published during this period.





The Spring of 2018 at Polytechnique Montréal



“There is something stronger than death, it is the presence of the absent, in the memory of the living.”

Jean d'Ormesson



# Prof. Ametani's Work in Winnipeg

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Aniruddha M. Gole

Distinguished Professor, Dept. of Electrical and Computer Eng.  
University of Manitoba



## Prof. Ametani's work in Winnipeg

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- ◆ At the University of Manitoba, Prof. Ametani collaborated with Prof. Behzad Kordi and Prof. Ani Gole
- ◆ He served on the Advisory Committees of several students:
  1. Barzan Tabei (Ph.D. student)
  2. Amy Shi (M.Sc.)
  3. B. Salarieh (M.Sc. student)
- ◆ He also mentored the work of numerous others (Ting Lin, Jonathan Liu, Jia Lu, Chen Jiang, Huanfeng Zhao and many others)
- ◆ In August 2019, CIGRE WG C4.55 (convener: A. Ametani, Secretary, J. De Silva) was established, and the first WG meeting was organized by the MHI at the Manitoba HVDC Research Centre on 2 Friday August 2019.

## Prof. Ametani's work in Winnipeg

- ◆ Dr. Ametani worked closely with Dr. Jeewantha De Silva, Jonathan Liu and others at MHI
- ◆ Improvement of computer models for accurate earth-return impedances. Efficient and numerically robust algorithms were developed to calculate earth return integrals that can be highly ill-conditioned. Prof. Ametani and Jonathan Liu developed the computer codes involving complex infinite integrals for inclusion in the PSCAD Line Constants Program.
- ◆ Dr. Ametani developed detailed notes to estimate the conductance ( $\tan\delta$ ) of cable insulators from sample tests. The general conductance routine is now part of the latest PSCAD LC program. The above formulae help eliminate numerical instability when simulating very-fast transients in gas-insulated substations.

# Prof. Ametani's work in Winnipeg

- ◆ Development of an electromagnetic model for the calculation of tower surge impedance based on thin wire approximation (M.Sc. Research of B. Salarieh)

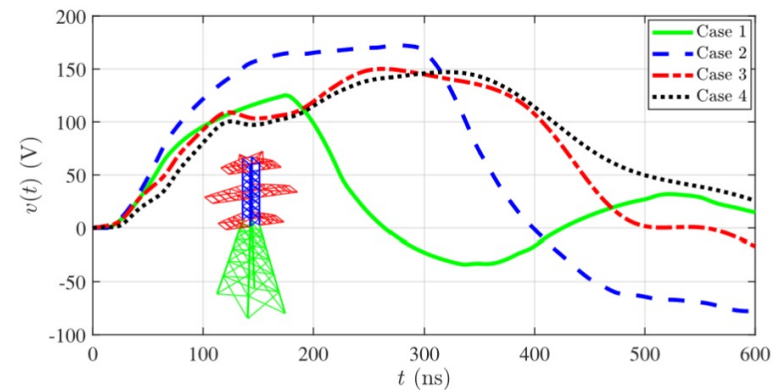
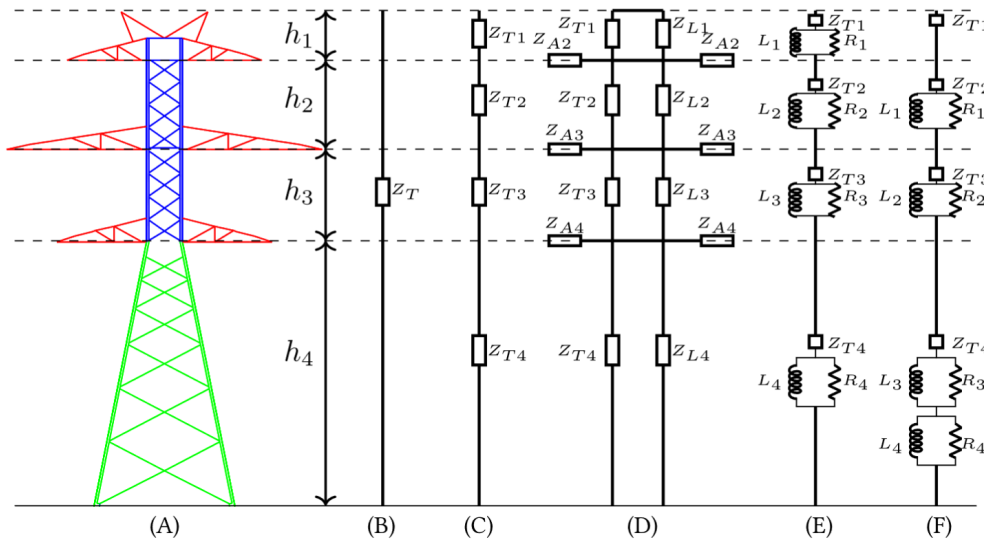


Fig. 5. The effect of tower elements on the voltage at the top of the structure for a ramp current with a rise time of  $t_r = 50$  ns injected into the structure.

400 kV double circuit transmission line tower, and its equivalent circuits: (B) lossless frequency-independent equivalent circuit, (C) multisection D) the model of Hara & Yamamoto [3] which considers the cross arms and bracings, (E) Multistory tower model, and (F) is the model of Baba [44].

# Prof. Ametani's work in Winnipeg

- ◆ Study of Skin and Proximity Effects of Conductors for MHL-Based Modeling of Power Transformers using FEM. (Ph.D. Research of Barzan Tabei)

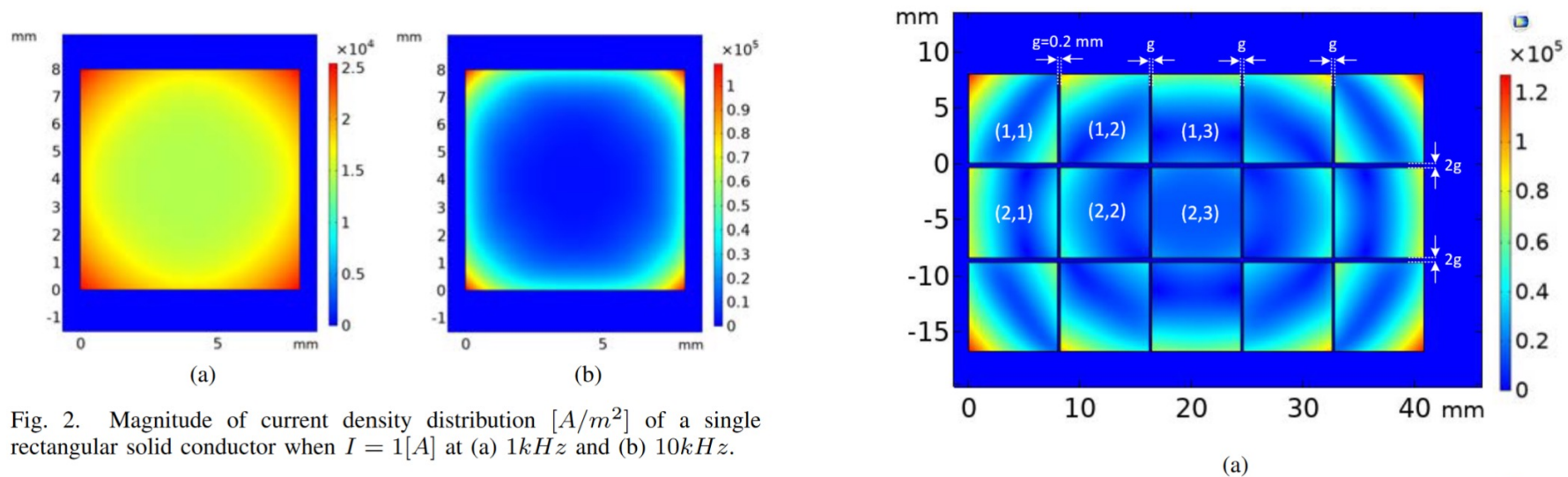


Fig. 2. Magnitude of current density distribution [ $A/m^2$ ] of a single rectangular solid conductor when  $I = 1[A]$  at (a)  $1kHz$  and (b)  $10kHz$ .

# Reminiscences of Dr. Ametani's tenure in Winnipeg

Prof. Ametani relaxing in Assiniboine Park



Dr. Ametani with Manitoba students in Japan





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# Laszlo Prikler

## Budapest University of Technology and Economics (Hungary)

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Hans Hoidalén

Norwegian University of Science and  
Technology, NTNU

IPST 2023 Technical Committee Member  
IPST 2013 Co-Chairperson (Vancouver)  
Cigre SC A2 member

Stephan Pack

Graz University of Technology, Austria

IPST 2023 Technical Committee Member  
IPST 2005 Co-Chairperson (Montreal)  
Cigre SC C4 member of advisory group

## Overview

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- ◆ Laszlo Prikler was a committed and reliable expert in the power system community
- ◆ He obtained his Master degree from Budapest University of Technology and Economics in power systems in 1986
- ◆ Since then he worked in teaching and research
- ◆ He was a Managing Director of Systran Engineering Services Ltd and worked world-wide as a consultant
  
- ◆ As a person he was always reliable, helpful and accurate in his activities
- ◆ He was respected by all colleagues, nationally and internationally
- ◆ He passed away too early in 2021

## Research Areas and Membership

- ◆ Electrical Engineering and Power Systems
- ◆ Modelling of Power System Transients
- ◆ Renewable Energy Studies
- ◆ Research Work with EMTP and ATP
- ◆ Major contributions in the User Manual of ATPDraw
  
- ◆ IEEE member in Power and Energy Society
- ◆ CIGRE SC C4 Power System Performance
- ◆ Chairman EEUG 2002-2004, EEUG Honorary Member
- ◆ IPST International Steering Committee Honorary Member





## Memories of Prikler's activities

- ◆ Local Organising Committee Chairperson of IPST 1999 in Budapest
- ◆ Organised EEUG 1996, 2002 in Budapest, Sopron
- ◆ EEUG 2003 in Graz, Speaker opening ceremony
- ◆ IPST 2005 in Montreal, Conference co-chairman
- ◆ CIGRE 2011 WG C4.307 in Graz, Resonance and ferroresonance in power networks and transformer energization studies



## Memories of Prikler's activities

- ◆ Organised the IPST 1999 conference in Budapest

### Welcome

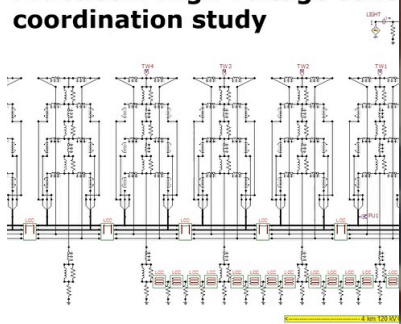
- ◆ Welcome to IPST '99, the third International Conference on Power Systems Transients.
- ◆ This biennial event was created for the exchange of scientific and technical information related to electromagnetic transients in electric power systems.



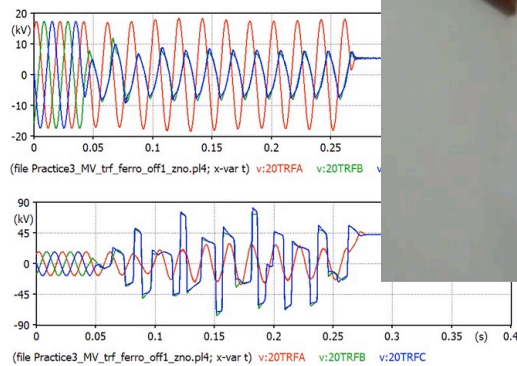
# Memories of Prikler's Activities

- ◆ Delivered two webinars on switching transients and transformer modeling to EEUG in Dec. 2020

## Practice1: High voltage substation coordination study



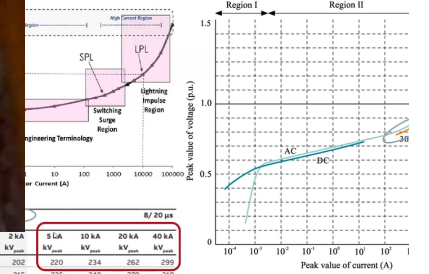
## Practice3: Ferroresonance study



## Types of Insulation Stresses (IEC 60071-1)

Frequency	Transient	Fast-front	Very-fast-front
 Temporary	 Slow-front	 Fast-front	 Very-fast-front
$10 \text{ Hz} < f < 500 \text{ Hz}$ $0.02 \text{ s} \leq T_1 \leq 3.600 \text{ s}$	$20 \mu\text{s} < T_p \leq 5.000 \mu\text{s}$ $T_2 \leq 20 \text{ ms}$	$0.1 \mu\text{s} < T_1 \leq 20 \mu\text{s}$ $T_2 \leq 300 \mu\text{s}$	$T_1 \leq 100 \text{ ns}$ $0.3 \text{ MHz} < f_1 < 100 \text{ MHz}$ $30 \text{ kHz} < f_2 < 300 \text{ kHz}$
 Short-duration power frequency test	 Switching impulse test	 Lightning impulse test	

## modelling considerations



# Prof. Akihiro Ametani and Laszlo Prikler

