

# IEEE PELS Educational Videos Keywords

## DC Technologies and Utility Applications

- DC power systems
- Control systems
- HVDC converters
- HVDC circuit breakers
- DC power transmission
- DC circuit breakers
- HVDC transmission lines
- Solid State Transformers

## DC-DC Converters

- Switched capacitor circuits
- DC-DC power conversion
- Resonant power conversion
- Soft-switching techniques
- Switched mode power supplies
- Consumer electronics
- Multiport converters
- Isolated converters
- Non-isolated converters
- High dc voltage gain converters
- Voltage multipliers
- Very-high-frequency (VHF) DC-DC converters
- Voltage fed DC-DC converters
- Current fed DC-DC converters

## AC-DC Converters

- AC-DC power conversion
- Bridgeless converters
- Active rectifiers
- Rectifiers
- Power factor correction
- Electrolytic capacitor-less converters
- Single-phase AC-DC converters
- Three-phase AC-DC converters
- Single-stage AC-DC conversion
- Two-stage AC-DC conversion
- Power buffer circuits
- Power decoupling

## DC-AC Inverters

- DC-AC power conversion
- Soft-switching DC-AC inverters
- Grid-connected DC-AC inverters
- Single-phase DC-AC inverters
- Three-phase DC-AC inverters
- Multi-phase DC-AC inverters
- Multilevel inverters
- Resonant DC-link inverters
- Grid-tied inverters
- Grid-forming inverters
- Grid-following inverters

## Lighting and Display

- Light-emitting diodes
- Lighting control
- Plasma applications
- Dimming
- Solid-state lighting
- Lighting
- LED drivers
- LED lighting power supplies
- Light flicker

## Wireless Power Transfer (WPT) and High Frequency Converters

- Soft-switching converters
- Resonant power conversion
- Electromagnetic induction
- Electromagnetic coupling
- Mutual coupling
- Transmitters
- Receivers
- Microwave power transmission
- Capacitive energy storage
- Inductive energy storage
- Magnetic resonance
- Dynamic WPT
- Static WPT
- Power Supply on Chips (PwrSoC)
- Zero voltage switching
- Zero current switching
- High frequency links

## **Advanced Control and Artificial intelligence**

- Intelligent control
- Optimal control
- Distributed control
- Kalman filtering
- Predictive control
- Model predictive control
- Linear-quadratic-Gaussian control
- H-infinity control
- Robust control
- Fuzzy control
- Lyapunov methods
- System identification
- Artificial intelligence
- Machine learning

## **Control and Stability**

- Pulse width modulation
- Frequency stability
- Modeling
- Inverse modeling
- Circuit modeling
- Circuit simulation
- Power system stability
- Stability
- Large-signal stability
- Small-signal stability
- Root loci
- Power control
- Current control
- Voltage control
- Virtual impedance
- Virtual synchronous machines
- Passive damping
- Active damping
- Digital control

## **Distributed generation and Microgrids**

- Power distribution
- Distributed energy resources
- Power distribution faults
- Fault currents
- Fault current limiters
- Fault tolerance
- Overcurrent protection
- DC microgrids
- AC microgrids

- Fault ride through
- Converter systems
- Droop control
- Current sharing
- Power sharing

## **Discrete and Integrated Semiconductors**

- Power semiconductor devices
- Semiconductor devices
- Bipolar transistor logic devices
- Gallium compounds
- Power MOSFETs
- Power FET switches
- Piezoelectric devices
- Semiconductor device packaging
- Semiconductor device modeling
- Semiconductor device measurements
- Silicon carbide devices
- Thyristors
- Thyristor applications
- Wide-band-gap devices
- Insulated gate bipolar transistors
- Device characterization
- Thermal management
- Switch drivers
- Power modules
- Packaging and integration
- Power supply in package

## **Passive Components and Materials**

- Transformers
- HF transformers
- Transformer cores
- Transformer windings
- Magnetic core
- Soft magnetic materials
- Magnetic devices
- Inductors
- Capacitance
- Superconducting coils
- Planar transformers
- Electrolytic capacitors
- Film capacitors
- Coupled inductors
- Integrated magnetics

## **Multilevel Converters**

- Multilevel systems
- Modulation
- Circuit topology
- DC-DC multilevel converter
- Neutral point clamped converters
- Flying capacitor converters
- Cascaded H-bridge converters
- Modular multilevel converter
- Switched-capacitor multilevel inverters

## **Motors and Drives**

- Permanent magnet motors
- Permanent magnet machines
- Finite element methods
- Induction motor drives
- Variable speed drives
- AC motor drives
- Road vehicle electric propulsion
- Adaptive observers
- AC motor protection
- Synchronous machines
- Machine system testing

## **Power Quality and Grid Synchronization**

- Power quality
- Harmonic distortion
- Unbalanced systems
- Active filters
- Power system harmonics
- Power conversion harmonics
- Static VAR compensators
- Passive filters
- Grid Code and Standards
- Electromagnetic interference
- Electromagnetic compatibility
- Phase locked loops
- Phase measurement
- Frequency estimation
- Frequency measurement
- Amplitude estimation
- Synchronization
- Disturbance rejection
- Grid impedance estimation

## **Reliability and Diagnostics**

- Reliability estimation
- Reliability modeling
- Industrial power system reliability
- Semiconductor device reliability
- Temperature measurement
- Redundancy
- Fault location
- Fault diagnosis
- Resilience
- Reliability testing
- Fault tolerance
- Condition monitoring

## **Renewable Energy**

- Photovoltaic power systems
- Photovoltaic effects
- Perturbation methods
- Solar power generation
- Solar energy
- Tracking
- Wind power generation
- Wind power transmission
- Wind turbine
- Energy resources
- Power conditioning
- Micro-inverters
- Energy management
- Maximum power point tracking
- Energy harvesting
- Curtailment
- Frequency response
- Power system inertia

## **Storage and Electric Vehicles**

- Energy storage
- Batteries
- Fuel cells
- Battery chargers
- Equalizers
- Road vehicle power systems
- State of charge (SoC)
- State of health (SoH)
- Cell balancing
- Battery management systems (BMS)
- Charge balancing
- Chargers

- V2G
- Electric vehicles
- Wireless charging
- Superconducting magnet energy storage

### **Emerging Topics**

- Aircraft power systems
- Cybernetics
- Cybersecurity
- Cyber-physical system
- Digital Twin
- Real-time simulation
- Hardware-in-the-loop
- Mission profile emulation
- Internet of things
- Blockchain