Discrete Electromechanical Oscillation Control (DEOC)

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Main idea
- Use controllable components to change the dynamical trajectory of an oscillatory behavior by injecting/absorbing active power through step-wisely controlled elements.
- Restore the initial equilibrium point at a determined time to significantly reduce the oscillation amplitude.
- Three main variables to determine:
  \( \Delta P \): to switch the eq. point form \( x_e \) to \( x_c \)
  \( t_{on} \): to activate the switched operation
  \( t_{off} \): to deactivate the switched operation

Projections

Switching Conditions

Validation

Remarks
- DEOC in multi-modal systems
  Progressive mode annihilation based on projections is used to handle multiple dominant modes.
- Proof of concept
  Simulations have shown effective reduction of oscillation amplitude.
- Subset of controllable components
  Injection/absorption of active power at some selected buses suffice to handle oscillations.

References