

Appendix: Decision-Dependent Uncertainty-Aware Preventive-Corrective Strategy against Electrically Induced Wildfires

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Nomenclature

Sets

- \mathcal{I} Set of buses in the system.
- \mathcal{G} Set of generating units in the system.
- \mathcal{L} Set of overhead power lines in the system.
- \mathcal{T} Set of time periods in the decision-making horizon.
- \mathcal{S} Set of scenarios.

Parameters

- a_g Operating cost of generating unit g .
- b_g Fixed cost of generating unit g when it is online.
- c_g^+, c_g^- Start-up/Shut-down cost of generating unit g .
- c_i^{sh} Load shedding cost for bus i .
- $c_{l,s}^{wf}$ Wildfire cost due to the ignition on line l in scenario s .
- ρ_s Probability of scenario s .
- τ_g^+, τ_g^- Minimum up-/down-time of generating unit g .
- R_g^+, R_g^- Ramp-up/-down rate of generating unit g .
- \hat{R}_g^+, \hat{R}_g^- Start-up/-down limit of generating unit g .
- \tilde{R}_g^+ Maximum sustained ramp rate of generating unit g .
- \tilde{R}_g^- Maximum quick start capacity of generating unit g .
- $\underline{P}_g^{gen}, \overline{P}_g^{gen}$ Minimum/Maximum capacity of generating unit g .
- δ Ratio for reserve requirement.
- $P_{i,t}^{de}$ Power demand of bus i , at time t .
- $\sigma_{i,g}$ Binary parameter equal to 1 if generating unit g is connected to bus i .
- B_l Susceptance of line l .
- U Big-M value.
- $\underline{\theta}_i, \overline{\theta}_i$ Minimum/Maximum values of voltage angle of bus i .
- $F_{l,t}^{dlr}$ Dynamic line rating (DLR) capacity of line l at time t .
- $\beta_{l,t,s}^L, \beta_{l,t,s}^M, \beta_{l,t,s}^H$ Binary parameter equal to 1 if wind gust is in low/medium/high level near line l at time t in scenario s .

Variables

$x_{l,t}$	Binary variable equal to 1 if overhead line l is shutoff intentionally at time t .
$u_{g,t}$	Binary variable equal to 1 if generating unit g is online at time t .
$u_{g,t}^+, u_{g,t}^-$	Binary variable equal to 1 if generating unit g starts up/shuts down at time t .
$p_{g,t,s}^{gen}$	Power output of generating unit g at time t in scenarios s .
$p_{i,t,s}^{sh}$	Load shedding on bus i at time t in scenario s .
$r_{g,t,s}^{sp}$	Spinning reserve of generating unit g at time t in scenario s .
$r_{g,t,s}^{Nsp}$	Total non-spinning reserve of generating unit g at time t in scenario s .
$n_{h,t,s}^+, n_{h,t,s}^-$	Non-spinning reserve of generating unit g when it is online/offline at time t in scenario s .
$\theta_{i,t,s}$	Voltage angle of bus i at time t in scenario s .
$f_{l,t,s}$	Power flow on overhead power line l at time t in scenario s .