**PROPOSALS FOR REDMINE 6811, MINNEAPOLIS MEETING 19 SEPTEMBER 2024**

**Definition for class Wires::ExternalNetworkInjection.**

Existing definition

This class represents the external network and is used for IEC 60909 calculations. It is only used if EquivalentInjection cannot provide the details required by IEC 60909 on short circuit equivalent of an external network.

Proposal Tokio June 2024

This is an open TODO as part of this issue.

Proposal Minneapolis September 2024

This class represents one or more networks as a single‑element ward or extended ward equivalent.

*Comment. Motivation is that this definition aligns with the definition in EquivalentInjection agreed in Tokio.*

A review of all attributes showed that for the ones listed below the descriptions can be improved. For example, references are made to terminology of IEC60909 that is not defined in that standard (or elsewhere).

Also consider:

|  |  |  |
| --- | --- | --- |
| **Attribute** | **Current description** | **New description** |
| ikSecond | Indicates whether initial symmetrical short-circuit current and power have been calculated according to IEC (Ik").  Used only if short circuit calculations are done according to superposition method. | Indicates initial symmetrical short-circuit current and power have been calculated according to IEC 60909 (Ik"). Used only if short circuit calculations are done according to superposition method. |
| maxInitialSymShCCurrent |   Maximum initial symmetrical short-circuit currents (Ik" max) in A (Ik" = Sk"/(SQRT(3) Un)). Used for short circuit data exchange according to IEC 60909. | <remove 2 blanks>Maximum initial symmetrical short-circuit currents (Ik" max) in A (Ik" = Sk"/(SQRT(3) Un)). Used for short circuit data exchange according to IEC 60909. |
| maxQ | Maximum reactive power limit. It is used for modelling of infeed for load flow exchange and not for short circuit modelling. | Maximum reactive power of the injection.  Used for modelling of infeed for load flow exchange. Not used for short circuit modelling. If maxQ and minQ are not used ReactiveCapabilityCurve can be used.Comment: to harmonise with EquivalentInjection. |
| maxR0ToX0Ratio | Maximum ratio of zero sequence resistance of Network Feeder to its zero sequence reactance (R(0)/X(0) max). Used for short circuit data exchange according to IEC 60909. | Maximum ratio of zero sequence resistance to zero sequence reactance (R(0)/X(0) max). Used for short circuit data exchange according to IEC 60909.Comment: to eliminate ref to Network Feeder. |
| maxR1ToX1Ratio | Maximum ratio of positive sequence resistance of Network Feeder to its positive sequence reactance (R(1)/X(1) max). Used for short circuit data exchange according to IEC 60909. | Maximum ratio of positive sequence resistance to positive sequence reactance (R(1)/X(1) max). Used for short circuit data exchange according to IEC 60909.Comment: to eliminate ref to Network Feeder. |
| minQ | Minimum reactive power limit. It is used for modelling of infeed for load flow exchange and not for short circuit modelling. | Minimum reactive power of the injection.  Used for modelling of infeed for load flow exchange. Not used for short circuit modelling. If maxQ and minQ are not used ReactiveCapabilityCurve can be used.Comment: to harmonise with EquivalentInjection. |
| minR0ToX0Ratio | Indicates whether initial symmetrical short-circuit current and power have been calculated according to IEC (Ik"). Used for short circuit data exchange according to IEC 60909. | Minimum ratio of zero sequence resistance to zero sequence reactance (R(0)/X(0) min). Used for short circuit data exchange according to IEC 60909.Comment: to eliminate ref to Network Feeder. |
| minR1ToX1Ratio | Minimum ratio of positive sequence resistance of Network Feeder to its positive sequence reactance (R(1)/X(1) min). Used for short circuit data exchange according to IEC 60909. | Minimum ratio of positive sequence resistance to positive sequence reactance (R(1)/X(1) min). Used for short circuit data exchange according to IEC 60909.Comment: to eliminate ref to Network Feeder. |

**Definition for class: Equivalent::EquivalentInjection**

Existing definition

This class represents equivalent injections (generation or load). Voltage regulation is allowed only at the point of connection. Using EquivalentInjection to model a distribution network equivalent is recommended practice instead of using ExternalNetworkInjection-s if it is not necessary that the equivalent contains detailed information representing a short circuit equivalent according to IEC 60909 which is relevant for short circuit studies.

Proposal Tokio June 2024

This class represents networks that have been equivalized using either the ward or extended ward method.

Proposal Minneapolis September 2024

This class represents one or more networks that have been equivalized using either the ward or extended ward method.

*Comment. Motivation is that equivalent can also be for one network.*