

WG13 Issues - CIM Issues #6785

Modelling of Ward and Extended Ward Equivalent by EquivalentInjection

05/08/2024 08:35 AM - Chavdar Ivanov

Status:	Closed		
Priority:	Normal		
Target version:			
Author/Contact Info:	Chavdar Ivanov	Standard(s):	61970-301, 61970-452
Base Release:	CIM18	Version:	
Solution to be Applied To:	CIM18v11	Clause:	
Solution Version:	CIM18v11	Sub-Clause:	
Solution Applied By:	Chavdar Ivanov	Paragraph:	
Completion Date:	06/04/2024	Table:	
CIM Keywords:	61970-Equivalents	Originally Closed in Version:	
Breaking Change:	Yes	Origination Date:	
Breaking Change Description:	Attributes are moved	Origination ID:	
CIM Impacted Groups:	WG13	Originally Assigned To:	
Requestor:			

Description

The current EquivalentInjection has some gaps that prevent to use it to represent ward or extended ward equivalent. Therefore it is recommended to apply the following changes:

- Add attribute EquivalentInjection.kind, type EquivalentInjectionKind

- add enumeration EquivalentInjectionKind

- add enum equivalentInjectionKind.ward

- add enum equivalentInjectionKind.extendedWard

- move r, x, from SC profile to EQ profile as they can be used for the power flow calculation. The negative and zero sequence should stay in SC profile

Define a rule that ward equivalent cannot be regulating voltage so we have dependency between the .kind attribute and the attributes related to the regulating capability

There could be an option to reuse the regulatingCapability instead of adding .kind, but we will need to refer to ward and extended ward in the description

Some references

ward: <https://pandapower.readthedocs.io/en/v2.1.0/elements/ward.html>

extended ward: <https://pandapower.readthedocs.io/en/v2.1.0/elements/xward.html>

Decision

15 May 2024

we agree to create 2 subclasses: WardEquivalent ExtendedWardEquivalent

- ExtendedWardEquivalent would have r, x, and the regulating status and voltage attributes all required attributes in the profile

- EquivalentInjection will be abstract in the profile

Martin will double check.

Marting replied - see notes.

The issue can be implemented and closed

Release Notes

The following classes were added WardEquivalent ExtendedWardEquivalent

The ExtendedWardEquivalent has r, x, and the regulating status and voltage attributes all required attributes in the profile. The attributes are moved from EquivalentInjection. ExtendedWardEquivalent gets r0, r2, x0, x2 as part of the SC profiles

EquivalentInjection is abstract in the profile

The association with ReactiveCapabilityCurve is moved to ExtendedWardEquivalent

Attribute regulationCapability is deleted as ExtendedWardEquivalent always has the capability to regulate. The regulationStatus is kept for SSH usage to have the ability to deactivate the voltage control although this is also questionable as this will turn the Extended ward to a ward.

Changes are applied in EQ, SC and SSH profiles.

History

#1 - 05/15/2024 11:02 AM - Chavdar Ivanov

- Decision updated

#2 - 05/15/2024 11:50 AM - Chavdar Ivanov

Reply from Martin

Following up on my homework action item, I've determined that the cases in which the existence of r and x doesn't match the regulating status only occurs for SynchronousMachines and not for EquivalentInjection, so that will not conflict with the ward/extended ward model.

-Martin Miller

#3 - 05/15/2024 11:51 AM - Chavdar Ivanov

- Decision updated

#4 - 06/04/2024 03:54 PM - Chavdar Ivanov

- Status changed from New to Open

- Solution to be Applied To set to CIM18v11

- Solution Version set to CIM18v11

- Solution Applied By set to Chavdar Ivanov

- Completion Date set to 06/04/2024

- Breaking Change changed from No to Yes

- Breaking Change Description set to Attributes are moved

- Release Notes updated

#5 - 06/05/2024 03:31 PM - Chavdar Ivanov

- Release Notes updated

#6 - 06/05/2024 03:32 PM - Chavdar Ivanov

- Status changed from Open to In Progress

#7 - 06/05/2024 03:32 PM - Chavdar Ivanov

- Status changed from In Progress to Closed