What is the difference between Type3 and Type 7 Load?

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Question

In the opendss manual it states the following for the various load model types:

3. Constant P but Q is modeled as a constant reactance.

4. P and Q variation defined by exponential values. For example this is used for Conservation Voltage Reduction (CVR) studies.

5. Constant current magnitude (common in distribution system analysis). P and Q vary linearly with voltage magnitude.

6. Constant P that can be modified by loadshape multipliers, but Q is a fixed value independent of time [fixed at nominal value].

7. Similar to 6, but Q is computed from a fixed reactance (varies with square of voltage)

What is the difference between type 3 and type 7?

Also, can you also explain more on type 4, maybe using an equation?

Answer

The difference between 3 and 7 is that the reactance in 7 representing the reactive power never varies regardless of the load shape or other load multipliers. In model 3 the vars will vary either by the Mult property of a Loadshape or the Qmult property, if specified.

Models 6 and 7 were implemented to represent some types converter-interfaced loads in which the vars stay nominally the same regardless of what the active power is doing -- at least for some period of time. This represents power converters programmed to hold constant reactive power even though the process is drawing/producing varying amounts of active power. Therefore, only the P part is modified by the load shape multipliers.

Models 6 and 7 have also been used to model some types of wind turbine generators (P set to a negative value to represent generation in the Load object).

Model 4: P varies from nominal based on $(Vpu)^{CVRWatts}$; Q varies from nominal based on $(Vpu)^{CVRvars}$. CVRWatts is typically 0.6 to 1.0; CVRvars is typically 3 or 4 (it would be 2 for a constant X load).

Note that you can specify the factors as a curve (a standard Loadshape object) and vary them hour by hour if you have the data. While hour-by-hour may not make much sense, daily, monthly, or seasonal variations can be represented by the curves.

--Rdugan 16:01, 28 January 2011 (UTC)

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