

# How many simultaneous faults?

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## Question

How many simultaneous faults can I represent?

## Answer

As many as you want. You can put a fault on every bus if there were a good reason to do so. There is no explicit limit on the number of Fault objects one can define. A Fault object is a *Power Delivery* element -- that is, it is completely defined by its *primitive Y matrix*. So theoretically you may model as many simultaneous faults as you can imagine. Since the Fault is simply a multi-phase resistor, all sorts of fault may be represented that might not be possible in other programs.

For example, you could apply a fault from phase 1 on one side of the street to phase 3 on the other side that is served from another feeder branch. This is tough in most short circuit programs, but not OpenDSS. Simply define the FAULT object as follows:

```
New Fault.F1_across_the_street phases=1 Bus1=Side1Bus.1 Bus2=Side2Bus.3
```

You can generally apply a fault during a power flow simulation. Modifications have been made to the LOAD models to accommodate very low voltages. So you can apply a fault in the middle of a sequential-time simulation and keep right on going.

You can also apply a FAULT object and perform a direct mode solution:

```
Solve Mode=Direct
```

In this mode, the solver simply performs a non-iterative solution of the present set of nodal admittance equations with defined voltage and current sources. As long as there are no floating subsections in the circuit, the solution should work. Loads are represented by constant impedances (admittances). Therefore, the accuracy of the load currents is in question. Many analysts disable all Load objects before performing fault analysis.

If Generators are present, the best approach is to switch to Dynamics mode and perform one time step after the application of Fault objects. When the

**set mode=dynamics Number=1**

command is executed, the Generator objects become Thevenin equivalents based on  $X_d'$ . Therefore you will see the Generator contribution to the fault.

--Rdugan 23:01, 25 September 2010 (UTC)

--127.0.0.1 19:05, 30 January 2015 (PST)

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