

source functions only affect the behavior of a module during small-signal analyses. The small-signal analyses provided by *SPICE* include the AC and noise analyses, but others are possible. When not active, the small-signal source functions return zero (0).

5.0.1 Analysis

The `analysis()` function takes one or more string arguments and returns one (1) if any argument matches the current analysis type. Otherwise it returns zero (0). The general form is

`analysis(analysis_list)`

There is no fixed set of analysis types. Each simulator can support its own set. However, simulators shall use the types listed in Table <\$chapnum>-22 to represent analyses which are similar to those provided by *SPICE*.

Table <\$chapnum>-22—Analysis types

Name	Analysis description
"ac"	.AC analysis
"dc"	.OP or .DC analysis (single point or dc sweep analysis)
"noise"	.NOISE analysis
"tran"	.TRAN analysis
"ic"	The initial-condition analysis which precedes a transient analysis.
"static"	Any equilibrium point calculation, including a DC analysis as well as those that precede another analysis, such as the DC analysis which precedes an AC or noise analysis, or the IC analysis which precedes a transient analysis.
"nodeset"	The phase during an equilibrium point calculation where nodesets are forced.

Any unsupported type names are assumed to not be a match.

Table <\$chapnum>-23 describes the implementation of the analysis function. Each column shows the return value of the function. A status of one (1) represents *True* and zero (0) represents *False*.

Table <\$chapnum>-23—Return values for analysis functions

Analysis	Argument	DC	Sweep ^a dc1 dc2	TRAN op Tran	AC op AC	NOISE op AC
First part of "static"	"nodeset"	1	1 1'	1 0	1 0	1 0
Initial DC state	"static"	1	1 1	1 0	1 0	1 0
Initial condition	"ic"	0	0 0	1 0	0 0	0 0
DC	"dc"	1	1 1	0 0	0 0	0 0
Transient	"tran"	0	0 0	1 1	0 0	0 0

Table <\$chapnum>-23—Return values for analysis functions, *continued*

Analysis	Argument	DC	Sweep ^a dc1 dc2	TRAN op Tran	AC op AC	NOISE op AC
Small-signal	"ac"	0	0 0	0 0	1 1	0 0
Noise	"noise"	0	0 0	0 0	0 0	1 1

a. Sweep refers to a DC analysis over a parameter sweep and is a super set of a single point dc analysis.

Using the `analysis()` function, it is possible to have a module behave differently depending on which analysis is being run.

Examples:

To implement nodesets or initial conditions using the analysis function and switch branches, use the following.

```

if ( analysis( "ic" ) )
    V(cap) <+ initial_value;
else
    I(cap) <+ ddt(C*V(cap));

```

5.0.2 DC Analysis

VerilogAMS supports a single-point DC analysis and also a multipoint DC Sweep analysis where multiple DC points are done over a sweep of parameter values. An operating point analysis is done for each DC point in the sweep. Doing a single point dc analysis is the same as an operating point analysis. The `analysis("dc")`, `analysis("static")` and `analysis("nodeset")` functions will return true for a single point DC analysis and also for every dc point in a sweep analysis.

The variable values will be rotated between two subsequent DC points in a DC Sweep analysis. The values of variables in the previous DC point will be used as the starting values for the next DC point.

5.0.3 AC stimulus

A small-signal analysis computes the steady-state response of a system which has been linearized about its operating point and is driven by a small sinusoid. The sinusoidal stimulus is provided using the `ac_stim()` function. The general form is

```

ac_stim( [analysis_name [ , mag [ , phase ] ] ] )

```

The AC stimulus function returns zero (0) during large-signal analyses (such as DC and transient) as well as on all small-signal analyses using names which do not match `analysis_name`. The name of a small-signal analysis is implementation dependent, although the expected name (of the equivalent of a *SPICE* AC analysis) is "ac", which is the default value of `analysis_name`. When the name of the small-signal analysis matches `analysis_name`, the source becomes active and models a source with magnitude