Compression Modeling in SysCalc

SysCalc models compression using the following formula.

$$P_{out} = \frac{10}{n}\log\left(\frac{B}{B+1}\right) + P_{sat}$$

where, $B = 10^{\frac{n\left(P_{in} - P_{sat} + Gain\right)}{10}}$

The general characteristics of this formula are similar to a High-Pass Filter. In the extremes,

$B \gg 1,\ P_{out} = P_{sat}$ // saturation

$B \ll 1,\ P_{out} = P_{in} + Gain$ // Linear gain

The factor, n, determines the "quickness" with which the output power saturates and uniquely relates P_{1dB} and P_{sat}. The factor, n, becomes larger as P_{1dB} and P_{sat} get closer in value. The following range applies:

$1.5 < P_{sat} - P_{1dB} < 9$ (dB)