

## APPENDIX B. MULTISIM ABM NOTATION

Below is a brief list of the basic notations which you are most likely to encounter when using ABM sources.

| Symbol         | Description                                                     |
|----------------|-----------------------------------------------------------------|
| +              | Add                                                             |
| -              | Subtract                                                        |
| *              | Multiply                                                        |
| /              | Divide                                                          |
| ^              | Exponential                                                     |
| exp(x)         | $e^x$                                                           |
| abs(x)         | $ x $                                                           |
| sqrt(x)        | Square root of x                                                |
| pwr(x,y)       | $x^y$                                                           |
| sin(x)         | Sine function of x                                              |
| cos(x)         | Cosine function of x                                            |
| tan(x)         | Tangent function of x                                           |
| TIME           | Simulation Time                                                 |
| PI             | Math constant $\pi$                                             |
| e              | Math constant e                                                 |
| stp(x) or u(x) | Step function $u(x)$                                            |
| V(x)           | Voltage at node x                                               |
| V(x,y)         | Voltage between nodes x and y                                   |
| I(vvx)         | Current into + terminal of a non-ABM independent voltage source |
| I(h1:xv2)      | Current into + terminal of current-dependent voltage source V2  |
| I(ev3)         | Current into + terminal of voltage-dependent voltage source V3  |
| I(bbv4)        | Current into + terminal of ABM voltage source V4                |

*A few example equations in translated into ABM notation...*

| Equation                                   | In ABM notation          |
|--------------------------------------------|--------------------------|
| $5\sqrt{V(2)+ V(3) }$                      | 5*sqrt(V(2)) + abs(V(3)) |
| $V(3) - V(2)$                              | V(3,2)                   |
| $3\cos(2\pi \cdot 10 \times 10^5 \cdot t)$ | 3*cos(2*PI*100000*TIME)  |
| $14 \cdot u(t-0.01)$                       | 14*stp(TIME - 0.01)      |
| $3 \cdot t^2 + 5 \cdot t + 2$              | 3*TIME^2 + 5*TIME + 2    |
| $6(e^{-0.015t} - 1)$                       | 6*(exp(-0.015*TIME) - 1) |