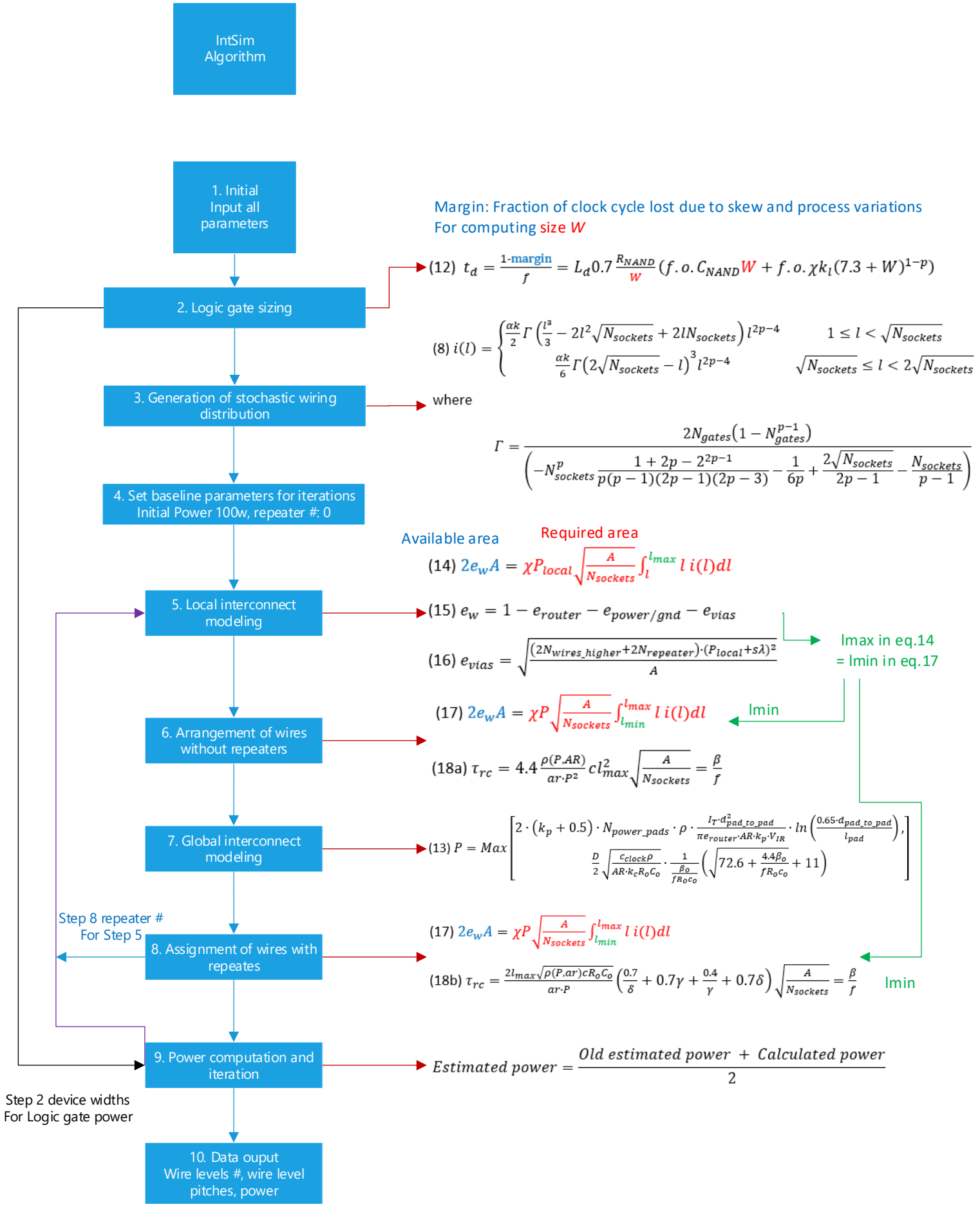
IntSim Algorithm
1. Initial Input all parameters
2. Logic gate sizing
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4. Set baseline parameters for iterations Initial Power 100w, repeater #: 0
5. Local interconnect modeling
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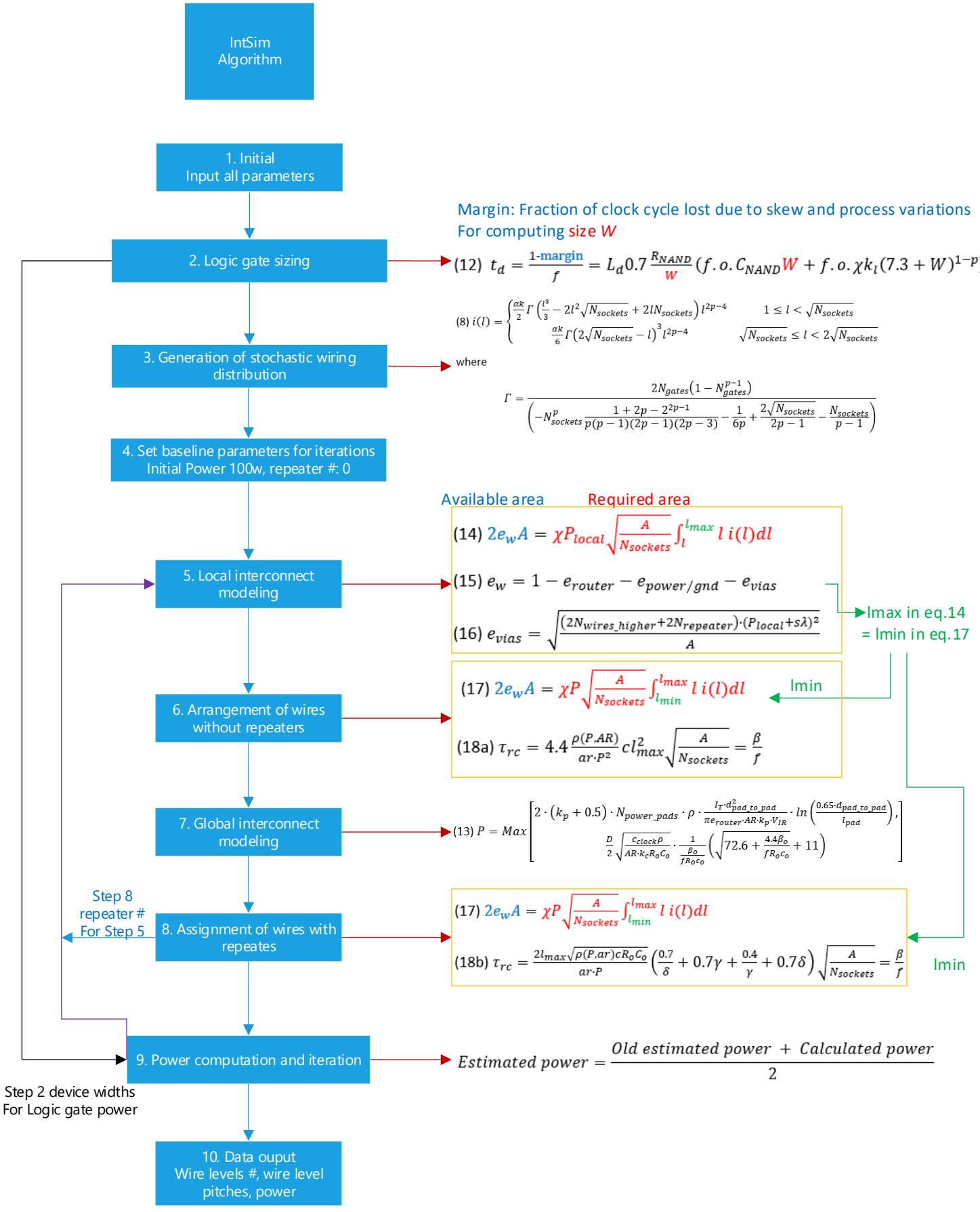
10. Data ouput Wire levels #, wire level pitches, power
Step 8 repeater # For Step 5
Step 2 device widths For Logic gate power
Margin: Fraction of clock cycle lost due to skew and process variations
For computing size W
(12) $t_d = \frac{1\text{-margin}}{f} = L_d 0.7 \frac{R_{NAND}}{W}(f.o.C_{NAND}W + f.o.\chi k_l(7.3+W)^{1-p})$
(8) $i(l) = \begin{cases} \frac{\alpha k}{2}\Gamma\left(\frac{l^3}{3} - 2l^2\sqrt{N_{sockets}} + 2lN_{sockets}\right)l^{2p-4} & 1 \le l < \sqrt{N_{sockets}} \\ \frac{\alpha k}{6}\Gamma\left(2\sqrt{N_{sockets}} - l\right)^3 l^{2p-4} & \sqrt{N_{sockets}} \le l < 2\sqrt{N_{sockets}} \end{cases}$
where
$\Gamma = \frac{2N_{gates}\left(1 - N_{gates}^{p-1}\right)}{\left(-N_{sockets}^{p}\frac{1+2p-2^{2p-1}}{p(p-1)(2p-1)(2p-3)} - \frac{1}{6p} + \frac{2\sqrt{N_{sockets}}}{2p-1} - \frac{N_{sockets}}{p-1}\right)}$
Available area
Required area
(14) $2e_wA = \chi P_{local}\sqrt{\frac{A}{N_{sockets}}}\int_l^{l_{max}} l\, i(l)dl$
(15) $e_w = 1 - e_{router} - e_{power/gnd} - e_{vias}$
(16) $e_{vias} = \sqrt{\frac{(2N_{wires\_higher} + 2N_{repeater})\cdot(P_{local}+s\lambda)^2}{A}}$
lmax in eq.14 = lmin in eq.17
(17) $2e_wA = \chi P\sqrt{\frac{A}{N_{sockets}}}\int_{l_{min}}^{l_{max}} l\, i(l)dl$
lmin
(18a) $\tau_{rc} = 4.4\frac{\rho(P.AR)}{ar\cdot P^2}cl_{max}^2\sqrt{\frac{A}{N_{sockets}}} = \frac{\beta}{f}$
(13) $P = Max\left[2\cdot(k_p+0.5)\cdot N_{power\_pads}\cdot\rho\cdot\frac{I_T\cdot d_{pad\_to\_pad}^2}{\pi e_{router}\cdot AR\cdot k_p\cdot V_{IR}}\cdot ln\left(\frac{0.65\cdot d_{pad\_to\_pad}}{l_{pad}}\right), \frac{D}{2}\sqrt{\frac{c_{clock}\rho}{AR\cdot k_c R_o C_o}}\cdot\frac{1}{\frac{\beta_o}{fR_oc_o}}\left(\sqrt{72.6 + \frac{4.4\beta_o}{fR_oc_o}} + 11\right)\right]$
(17) $2e_wA = \chi P\sqrt{\frac{A}{N_{sockets}}}\int_{l_{min}}^{l_{max}} l\, i(l)dl$
(18b) $\tau_{rc} = \frac{2l_{max}\sqrt{\rho(P.ar)cR_oC_o}}{ar\cdot P}\left(\frac{0.7}{\delta} + 0.7\gamma + \frac{0.4}{\gamma} + 0.7\delta\right)\sqrt{\frac{A}{N_{sockets}}} = \frac{\beta}{f}$
lmin
$Estimated\ power = \frac{Old\ estimated\ power\ +\ Calculated\ power}{2}$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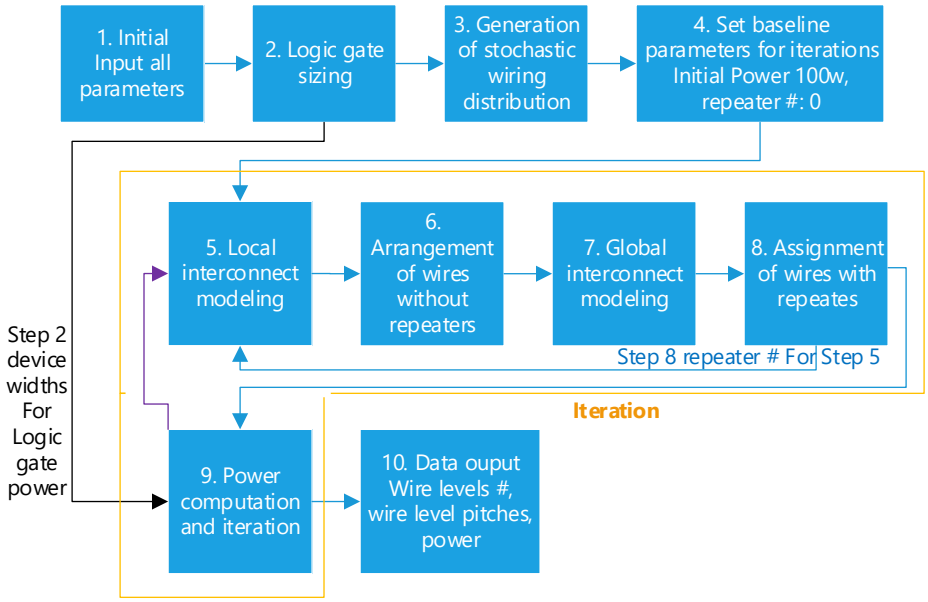
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