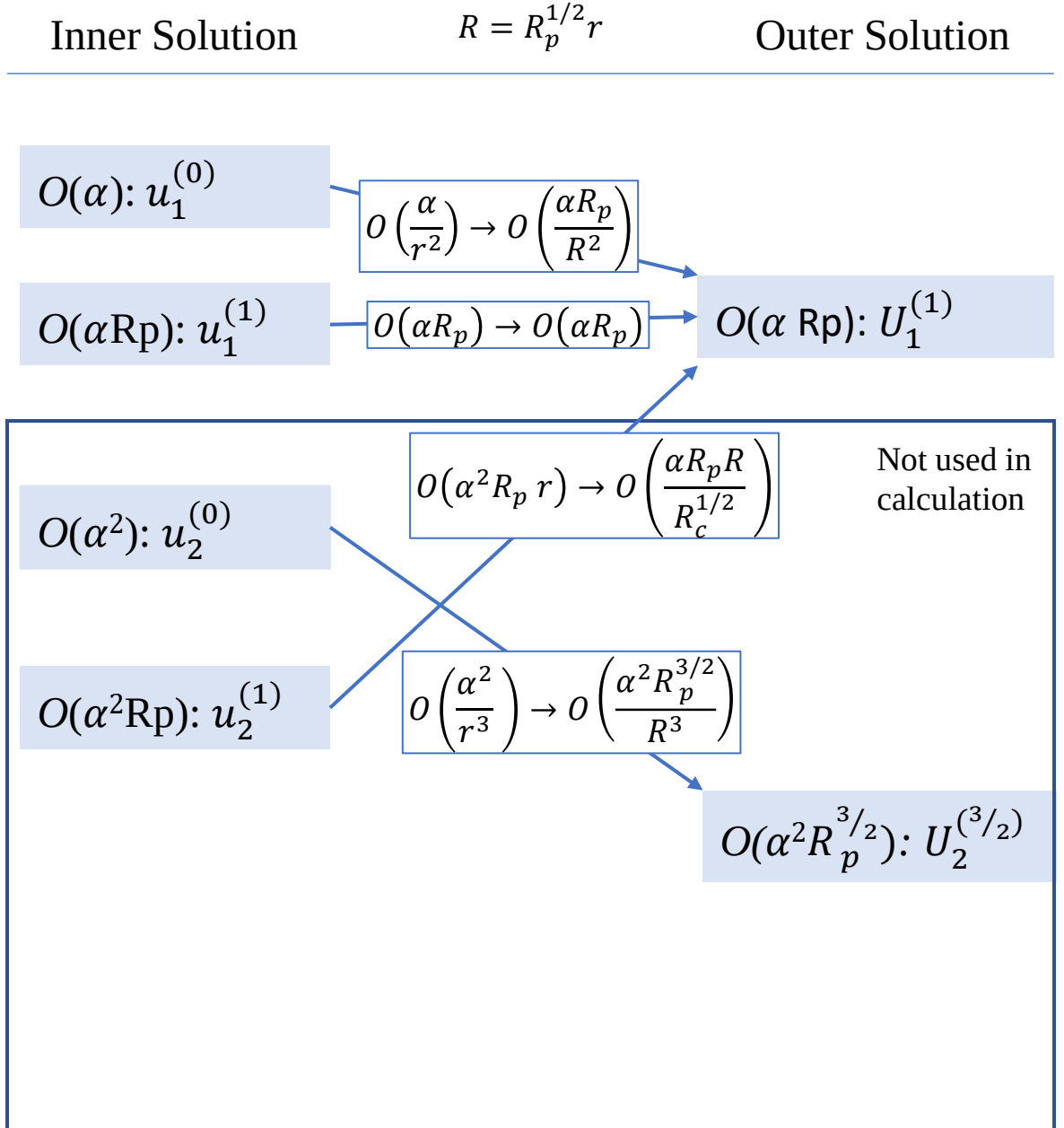
Inner Solution
$R = R_p^{1/2} r$
Outer Solution
$O(\alpha)$: $u_1^{(0)}$
$O\left(\frac{\alpha}{r^2}\right) \rightarrow O\left(\frac{\alpha R_p}{R^2}\right)$
$O(\alpha \mathrm{Rp})$: $u_1^{(1)}$
$O(\alpha R_p) \rightarrow O(\alpha R_p)$
$O(\alpha$ Rp): $U_1^{(1)}$
$O(\alpha^2 R_p\, r) \rightarrow O\left(\frac{\alpha R_p R}{R_c^{1/2}}\right)$
Not used in calculation
$O(\alpha^2)$: $u_2^{(0)}$
$O(\alpha^2 \mathrm{Rp})$: $u_2^{(1)}$
$O\left(\frac{\alpha^2}{r^3}\right) \rightarrow O\left(\frac{\alpha^2 R_p^{3/2}}{R^3}\right)$
$O(\alpha^2 R_p^{3/2})$: $U_2^{(3/2)}$