$$
\begin{aligned}
P_s\left[\frac{i_o}{n_o}\middle|\frac{i_c}{n_c}\right] &= \left(1-\frac{(n_c-1)}{N}\right)\frac{n_c-i_c}{n_c}P_s\left[\frac{i_o}{n_o-1}\middle|\frac{i_c}{n_c-1}\right] && (1a)\\
&\quad+\frac{n_c-i_c}{N}P_s\left[\frac{i_o}{n_o-1}\middle|\frac{i_c}{n_c}\right] && (2a)\\
&\quad+\left(1-\frac{n_c-2}{N}\right)\frac{i_c}{n_c}s\left(1-\frac{n_c-1}{N}\right)\frac{n_c-i_c}{n_c-1}P_s\left[\frac{i_o}{n_o-1}\middle|\frac{i_c-1}{n_c-2}\right] && (3a)\\
&\quad+\frac{i_c}{N}s\frac{n_c-i_c}{N}P_s\left[\frac{i_o}{n_o-1}\middle|\frac{i_c}{n_c}\right] && (4a)\\
&\quad+\frac{i_c}{N}s\left(1-\frac{n_c-1}{N}\right)\frac{n_c-i_c}{n_c}P_s\left[\frac{i_o}{n_o-1}\middle|\frac{i_c}{n_c-1}\right] && (5a)\\
&\quad+\left(1-\frac{n_c-1}{N}\right)\frac{i_c}{n_c}s\left(\frac{n_c-i_c}{N}\right)P_s\left[\frac{i_o}{n_o-1}\middle|\frac{i_c-1}{n_c-1}\right] && (6a)\\
&\quad+\left(1-\frac{(n_c-1)}{N}\right)\frac{i_c}{n_c}(1-s)P_s\left[\frac{i_o-1}{n_o-1}\middle|\frac{i_c-1}{n_c-1}\right] && (1d)\\
&\quad+\frac{i_c}{N}(1-s)P_s\left[\frac{i_o-1}{n_o-1}\middle|\frac{i_c}{n_c}\right] && (2d)\\
&\quad+\left(1-\frac{n_c-2}{N}\right)\frac{i_c}{n_c}s\left(1-\frac{n_c-1}{N}\right)\frac{i_c-1}{n_c-1}P_s\left[\frac{i_o-1}{n_o-1}\middle|\frac{i_c-2}{n_c-2}\right] && (3d)\\
&\quad+\frac{i_c}{N}s\frac{i_c-1}{N}P_s\left[\frac{i_o-1}{n_o-1}\middle|\frac{i_c}{n_c}\right] && (4d)\\
&\quad+\frac{i_c}{N}s\left(1-\frac{n_c-1}{N}\right)\frac{i_c-1}{n_c}P_s\left[\frac{i_o-1}{n_o-1}\middle|\frac{i_c-1}{n_c-1}\right] && (5d)\\
&\quad+\left(1-\frac{n_c-1}{N}\right)\frac{i_c}{n_c}s\frac{i_c-1}{N}P_s\left[\frac{i_o-1}{n_o-1}\middle|\frac{i_c-1}{n_c-1}\right] && (6d)\\
&\quad+\left(1-\frac{n_c-1}{N}\right)\frac{i_c}{n_c}s\frac{1}{N}P_s\left[\frac{i_o-1}{n_o-1}\middle|\frac{i_c-1}{n_c-1}\right] && (7d)\\
&\quad+\left(\frac{i_c}{N}\right)s\frac{1}{N}P_s\left[\frac{i_o-1}{n_o-1}\middle|\frac{i_c}{n_c}\right] && (8d)
\end{aligned}
$$