① $c_A = \frac{N_A}{V}$ $\quad x_A = \frac{N_A}{N_A + N_B}$

$y_A = \frac{c_A}{c_A + c_B}$ $\quad P_A = x_A P = \left(\frac{N_A}{N_A + N_B}\right) P$

$\Sigma x_A = 1$ $\quad \Sigma y_A = 1$

$P_B = \left(\frac{N_B}{N_A + N_B}\right) P$

② $v = \frac{\Sigma c_i v_i}{\Sigma v_i}$ $\quad u = \frac{\Sigma f_i u_i}{\Sigma f_i}$ $\quad v = \Sigma x_A v_A + \Sigma x_B v_B$

③ $N_A = c_A v_A$ $\quad J_A = c_A (v_A - v)$ $\quad J_A = c_A (v_A - v)$

$N_B = c_B v_B$ $\quad J_B = c_B (v_B - v)$ $\quad J_B = c_B (v_B - v)$

④ $I_A = c_A (v_A - v)$ $\quad I_B = c_B (v_B - v)$

⑤ $J_A = c_A (v_A - v)$ $\quad J_B = c_B (v_B - v)$

$= c_A \left(v_A - \frac{c_A v_A + c_B v_B}{v_A + v_B}\right)$ $\quad = c_B \left(v_B - \frac{c_B v_B + c_A v_A}{v_A + v_B}\right)$

(If v is the reference velocity)

$J_A = c_A v_A - \frac{c_A}{c_A + c_B} (c_A v_A + c_B v_B)$

$= N_A - \frac{c_A}{c_A + c_B} (N_A + N_B)$

Similarly, $J_B = N_B - \frac{c_B}{c_A + c_B} (N_A + N_B)$