$$\omega_p^2(A) = \frac{SS_A - df_A * MSe}{SS_A + (n - df_A) * MS_e} = \frac{df_A * (F_A - 1)}{df_A * (F_A - 1) + n}$$

df_A : degrees of freedom of factor A
F_A : F-Value of factor A
n : observations
MS_e : error squares
SS_A : sum of squares of factor A

The above is true because:

$$\frac{df_A * (F_A - 1)}{df_A * (F_A - 1) + n}$$

$$\text{because } F_A = \frac{MS_A}{MSe}$$

$$= \frac{df_A * \frac{MS_A}{MSe} - df_A}{df_A * \frac{MS_A}{MSe} - df_A + n}$$

$$= \frac{df_A * (MS_A - MSe)}{df_A * MS_A - df_A * MSe - n * MS_e}$$

$$= \frac{df_A * MS_A - df_A * MSe}{df_A * MS_A - df_A * MSe - n * MS_e}$$

$$\text{because } SS_A = df_A * MS_A$$

$$= \frac{SS_A - df_A * MSe}{SS_A - df_A * MSe + n * MS_e}$$

$$= \frac{SS_A - df_A * MSe}{SS_A + (n - df_A) * MS_e}$$

q.e.d.