SE for k ratio in APIM using the first order delta method

$k = p/a$

$$SE_{p/a} = \sqrt{\begin{bmatrix} \frac{1}{a} & -\frac{p}{a^2} \end{bmatrix} \begin{bmatrix} s_p^2 & s_{pa} \\ s_{pa} & s_a^2 \end{bmatrix} \begin{bmatrix} \frac{1}{a} \\ -\frac{p}{a^2} \end{bmatrix}} = \sqrt{\begin{bmatrix} \frac{s_p^2}{a} - \frac{ps_{pa}}{a^2} & \frac{s_{pa}}{a} - \frac{ps_a^2}{a^2} \end{bmatrix} \begin{bmatrix} \frac{1}{a} \\ -\frac{p}{a^2} \end{bmatrix}} = \sqrt{\frac{s_p^2}{a^2} - \frac{ps_{pa}}{a^3} - \frac{ps_{pa}}{a^3} + \frac{p^2 s_a^2}{a^4}}$$

$$= \sqrt{\frac{s_p^2}{a^2} - \frac{2ps_{pa}}{a^3} + \frac{p^2 s_a^2}{a^4}}$$

a = unstandardized actor effect,
p = unstandardized partner effect
s_a^2 = variance (SE^2) actor effect
s_p^2 = variance (SE^2) partner effect
s_{pa} = covariance between actor and partner effect