$$\frac{\mathrm{signal}}{\mathrm{noise}} = \frac{\mathrm{N_{star}}}{\sqrt{\mathrm{N_{star}} + \ (\mathrm{N_{backpp}} * \mathrm{npix}) + \ (\mathrm{N_{thermpp}} * \mathrm{npix}) + \ (\mathrm{R}^2 * \mathrm{npix})}}$$