$$\Delta t = \int_S \frac{1}{v} ds - \int_G \frac{1}{c} dg \tag{76}$$

$$\ell = \int_S \frac{c}{v} ds - \int_G dg \tag{77}$$

$$\ell = \int_S \frac{c}{v} ds - \int_S ds + \int_S ds - \int_G dg \tag{78}$$

$$\ell = \int_S (n-1) ds + S - G \tag{79}$$

Δt: time delay
v: propagation velocity
c: speed of light in vacuum
S: actual path
G: straight line; path in vacuum
ℓ: excess path length
n: refractive index in the atmosphere