and:

$$\begin{aligned}\left|\tilde{u}_{tot}^{\parallel}(x,t)\right| &\equiv \sqrt{\tilde{u}_{tot}^{\parallel}(x,t)\cdot\tilde{u}_{tot}^{\parallel *}(x,t)}\\ &= \frac{|\tilde{A}|}{\rho_o c}\sqrt{\left(1-|\tilde{R}|e^{i(2kx+\Delta\varphi_{BA}^o)}\right)\cdot\left(1-|\tilde{R}|e^{i(2kx+\Delta\varphi_{BA}^o)}\right)^*}\\ &= \frac{|\tilde{A}|}{\rho_o c}\sqrt{\left(1-|\tilde{R}|e^{i(2kx+\Delta\varphi_{BA}^o)}\right)\cdot\left(1-|\tilde{R}|e^{-i(2kx+\Delta\varphi_{BA}^o)}\right)}\\ &= \frac{|\tilde{A}|}{\rho_o c}\sqrt{1-|\tilde{R}|e^{i(2kx+\Delta\varphi_{BA}^o)}-|\tilde{R}|e^{-i(2kx+\Delta\varphi_{BA}^o)}+|\tilde{R}|^2}\\ &= \frac{|\tilde{A}|}{\rho_o c}\sqrt{1-|\tilde{R}|\left\{e^{i(2kx+\Delta\varphi_{BA}^o)}+e^{-i(2kx+\Delta\varphi_{BA}^o)}\right\}+|\tilde{R}|^2}\\ &= \frac{|\tilde{A}|}{\rho_o c}\sqrt{1-2|\tilde{R}|\cos\left(2kx+\Delta\varphi_{BA}^o\right)+|\tilde{R}|^2}\end{aligned}$$

Thus, *e.g*. for an observer/listener's position $x = 0$, **.and.** for ***equal-strength*** over-pressure amplitudes $|\tilde{A}| = |\tilde{B}| \Rightarrow |\tilde{R}| \equiv |\tilde{B}|/|\tilde{A}| = 1$ (*i.e*. a ***pure*** standing wave!) these formulae simplify to:

$$\left|\tilde{p}_{tot}(x=0,t)\right| = \sqrt{2}\,|\tilde{A}|\sqrt{1+\cos\Delta\varphi_{BA}^o} \text{ and: } \left|\tilde{u}_{tot}^{\parallel}(x=0,t)\right| = \frac{\sqrt{2}\,|\tilde{A}|}{\rho_o c}\sqrt{1-\cos\Delta\varphi_{BA}^o}$$

Thus, we see that when: $\Delta\varphi_{BA}^o = 0, \pm 2\pi, \pm 4\pi, ... = \pm n_{even}\pi$ that: $\cos\Delta\varphi_{BA}^o = +1$ and thus:

$$\left|\tilde{p}_{tot}(x=0,t)\right| = 2|\tilde{A}| \text{ and: } \left|\tilde{u}_{tot}^{\parallel}(x=0,t)\right| = 0$$

i.e. we have complete constructive (destructive) interference associated with the two individual complex over-pressure (longitudinal particle velocity) amplitudes, respectively.

We also see that when: $\Delta\varphi_{BA}^o = \pm 1\pi, \pm 3\pi, \pm 5\pi, ... = \pm n_{odd}\pi$ that: $\cos\Delta\varphi_{BA}^o = -1$ and thus:

$$\left|\tilde{p}_{tot}(x=0,t)\right| = 0 \text{ and: } \left|\tilde{u}_{tot}^{\parallel}(x=0,t)\right| = 2|\tilde{A}|/\rho_o c$$

i.e. we have complete destructive (constructive) interference associated with the two individual complex over-pressure (longitudinal particle velocity) amplitudes, respectively.

Hence, we can also now see that when $|\tilde{R}| \equiv |\tilde{B}|/|\tilde{A}| \neq 1$, it is ***not*** possible to ever achieve ***complete*** constructive/destructive interference effects between the two individual right- and left-moving complex over-pressure and/or longitudinal particle velocity amplitudes.

Since: $\tilde{p}_{tot}(x,t) = \tilde{A}\left[1 + |\tilde{R}|e^{i(2kx+\Delta\varphi_{BA}^o)}\right]e^{i(\omega t-kx)}$ and: $\tilde{u}_{tot}^{\parallel}(x,t) = \frac{\tilde{A}}{\rho_o c}\left[1-|\tilde{R}|e^{i(2kx+\Delta\varphi_{BA}^o)}\right]e^{i(\omega t-kx)}$,

the phases of the complex total/resultant pressure and longitudinal particle velocity associated with the two counter-propagating 1-D monochromatic plane waves are given by: