reflections, Figure 4.

This destructive interference, seen as a minimum in the overlapped pulse pattern, puts no restrictions on the values of the phase changes at the two boundaries except that the difference is Π radians at a particular set of frequencies. It is evident from Figure 4 that destructive interference occurs whenever

$$2\ell = n\lambda$$

or when

$$2\ell = \frac{nv}{F}$$

ℓ = sample length
λ = wavelength
v = velocity
F = frequency

This can be rewritten as: $F = nFo$ where $Fo = v/2\ell$ is a fundamental frequency corresponding to $2\ell = \lambda$. However, Fo is most easily determined by measuring the frequency difference between two successive minima:

$$F_o = F_n - F_{n-1}$$

In order to compute the ultrasonic velocities from these fundamental frequencies, it is necessary to know the length of the specimen at each pressure. Although the sample length can be measured during the experiment, it is possible to calculate the sample length once the changes in fundamental frequency with pressure and the initial sample length and density are known. The frequency differences between the fundamental frequency versus pressure curves for increasing and decreasing pressures provides information about the permanent deformation of the sample length during the pressure cycle. This calculation is more sensitive to small length changes than a direct measurement since the sample length is expressed in terms of an integral number of wavelengths of the radiation.

Since the elastic properties, as well as the density and dimensions, of an elastic solid change when pressure is applied, it is necessary to simultaneously consider the changes in the specimen's ultrasonic wave velocities,