Waves propagation inside an enclosed long duct

Dimensions of the duct: 40m ×1m ×1m;

Source: monopole point source in the volume center with power of 1W.

Mesh size for calculation: the maximum size and the minimum size were both 0.2m.

Boundary condition: all the 6 surfaces were set as ‘sound hard boundary’.

The material in the enclosed spaces is air, the density and the speed of sound were set as default ‘from material’.

Case 1

Frequency for calculation: 34.3 Hz.

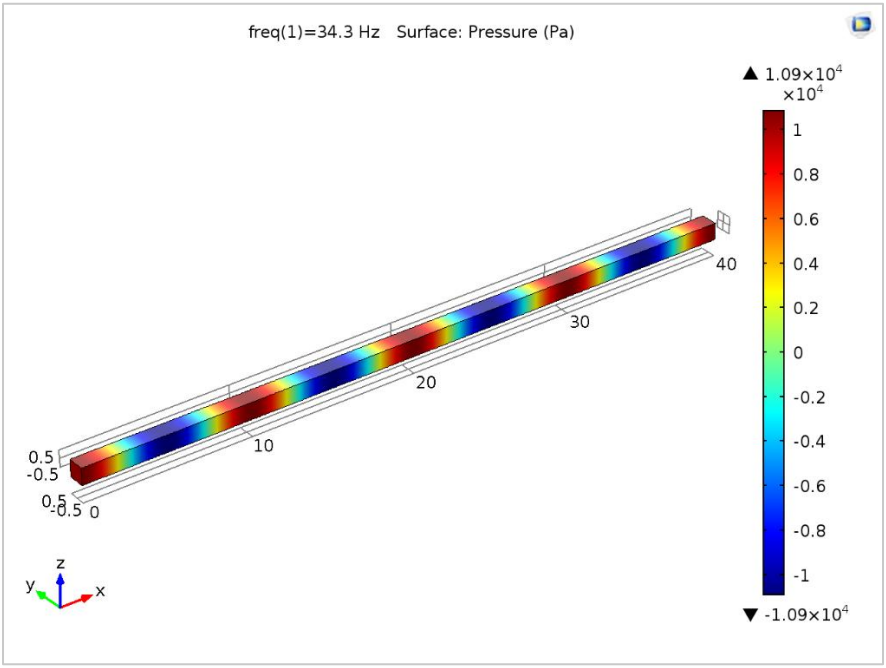

Fig. 1 Acoustic pressure distribution on the surface of the duct with frequency of 34.3Hz.

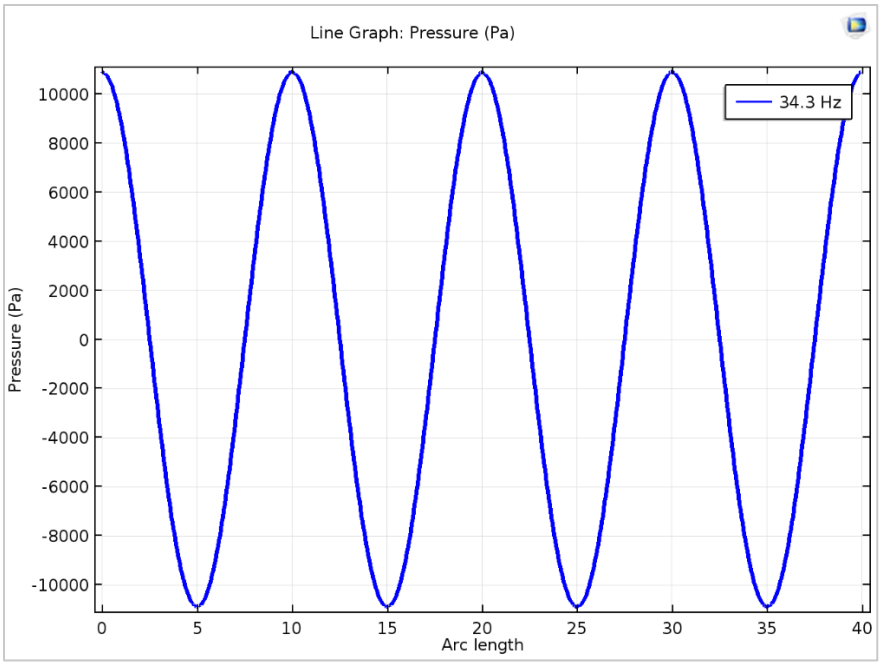

Fig. 2 Line graph of acoustic pressure along the duct when the frequency was 34.3Hz.

Case 2

Frequency for calculation: 34 Hz.

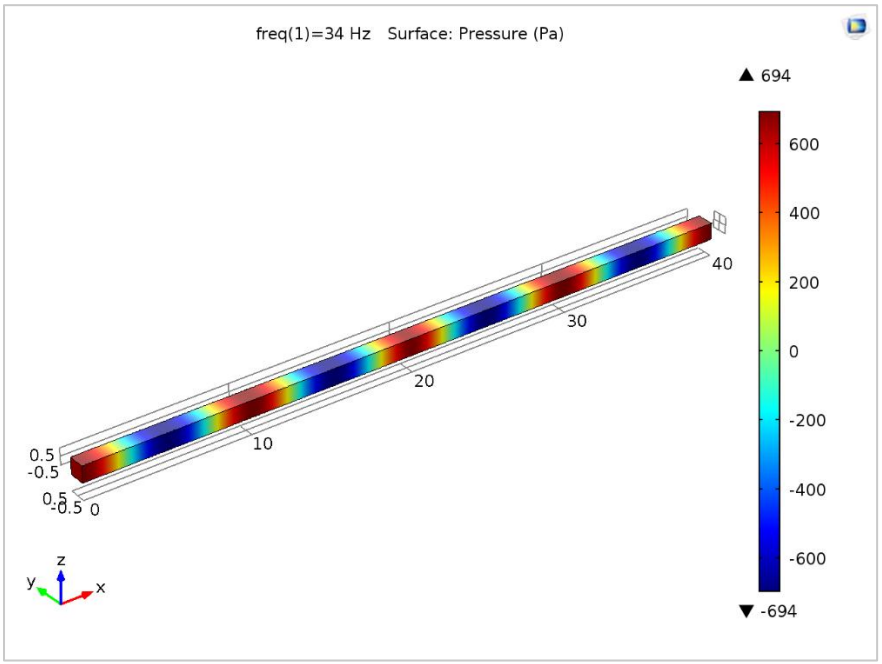

Fig. 3 Acoustic pressure distribution along the duct with frequency of 34 Hz.

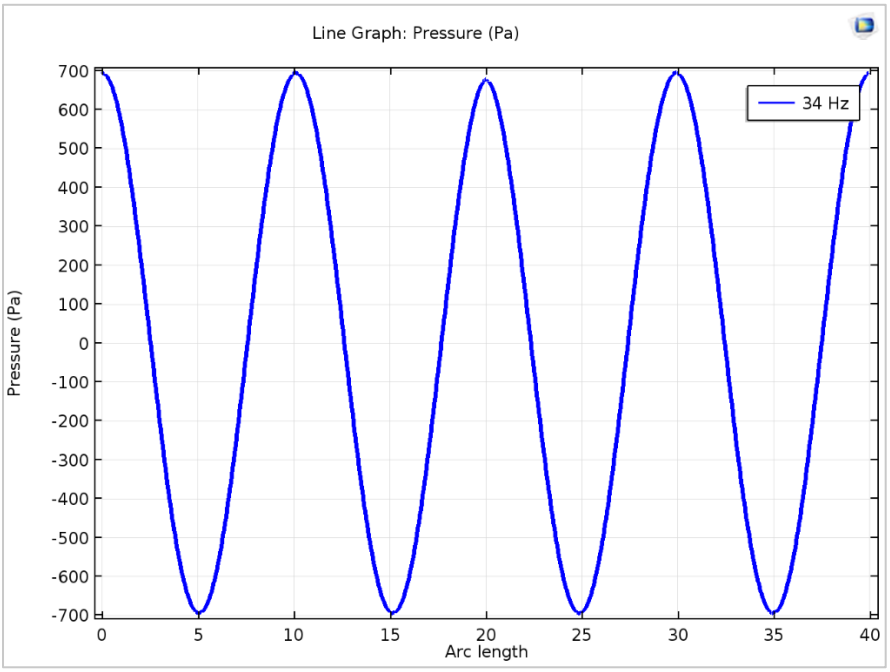

Fig. 4 Line graph of acoustic pressure along the duct when the frequency was 34Hz.

Question

Since the default value of speed of sound in COMSOL is 343m/s, compare with the maximum pressure achieved with frequency of 34Hz, the maximum pressure value with 34.3Hz gets higher (1.09*10^4 Pa), but why is it still not infinity?