3. Results.

The resonance bodies is formed from bars with diminishing variable sections (exponential, by steps, in the shape of a truncated cone) The acoustic chain is formed from two or more resonance bodies which are fastened together by a screw and it is excited by a piezoelectric transducer with a resonant frequency of ultrasonic propagation through the material bar. In fig. 1 it is presented a resonance body with variable section by steps. In fig. 2 it is presented a resonance body with variable section by steps connected by circular radius r_{ac}. In fig. 3 it is presented a resonance body with variable section by step connected by exponential radius. In fig. 4 it is presented a resonance body with variable section in the shape of a truncated cone. With the help of the calculation program and a presented method we have obtained the following conclusions:

→ measured the resonance frequency of these resonance bodies by using the echo method of an ultrasound which has a variable frequency. We determined the maximum echo;

→ determined the propagation velocity, through calculation, for these resonance bodies by $v = \lambda \cdot f$ and compared with the geometrical dimensions for make a verification of this method with experimental results.

→ determined the shapes of the vibration amplitude variation in Ox direction given by ζ^1 curve. Notice the null vibration point where it is possible to catch the mechanical ensemble.

→ determined the areas of the resonance bodies sections which are given by expression $\sqrt{\frac{A(z_p)}{\pi}} \cdot 10^2$;

→ determined the points with maximum demand; experiments have also shown that because high level of mechanical tension, when acoustic systems are subjected to high ultrasonic fields they break or fissure along the points with maximum demand.

→ determined the influence of the variation of geometrical dimensions on the shapes of mechanical tensions and on the position of the null vibration point.

→ determined the mechanical tensions in the resonance bodies which are given by $(\Delta\zeta_{1p}) \cdot 10^{-2}$, where $\Delta\zeta 1(x,t) = \frac{d}{dx}\zeta_1(x,t)$.

We observe that the mechanical tension is at its maximum immediately after the section step jump takes place, while its level is mitigated when the passage between two sections happens through a connection radius.

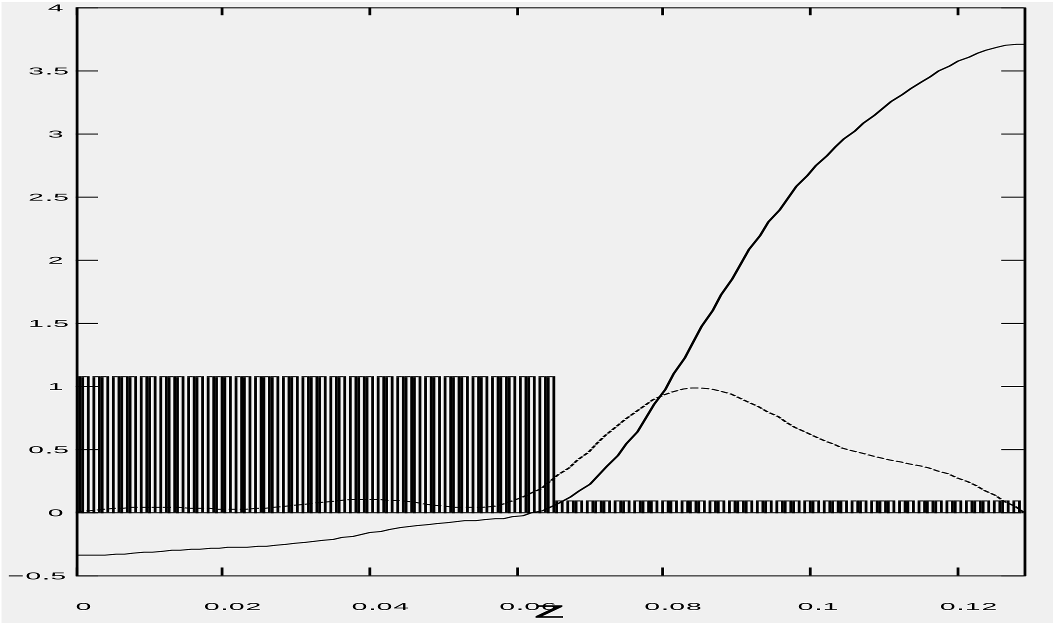

Fig. 1. Resonance body with variable section by steps.
-- The variation of vibration amplitude of resonance body.
The variation of resonance body section.
- -The variation of mechanical tensions in resonance body.

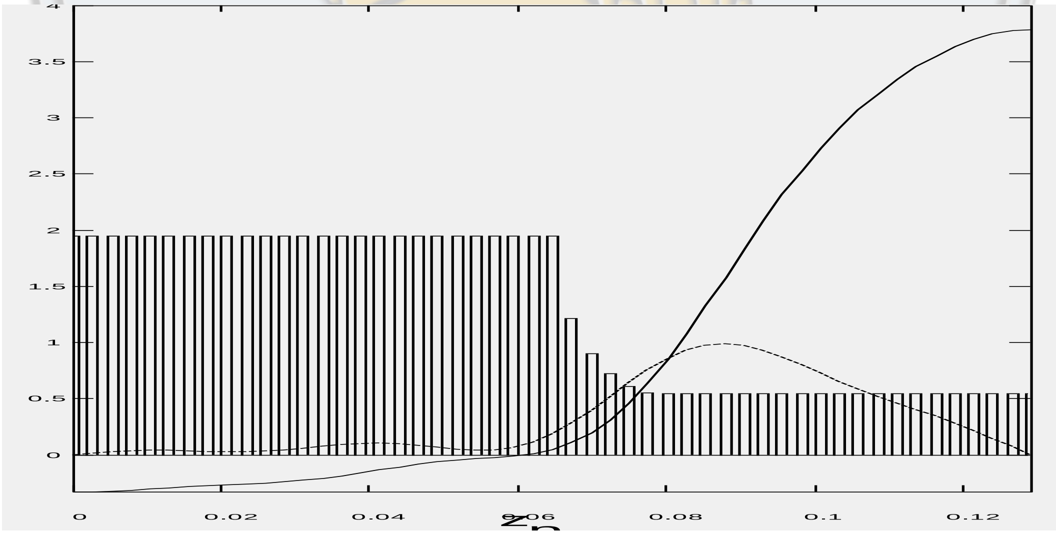

Fig. 2. Resonance body with variable section by steps connected by circular radius r_{ac}.
----The variation of vibration amplitude of resonance body.
The variation of resonance body section.
- - - The variation of mechanical tensions in resonance body.

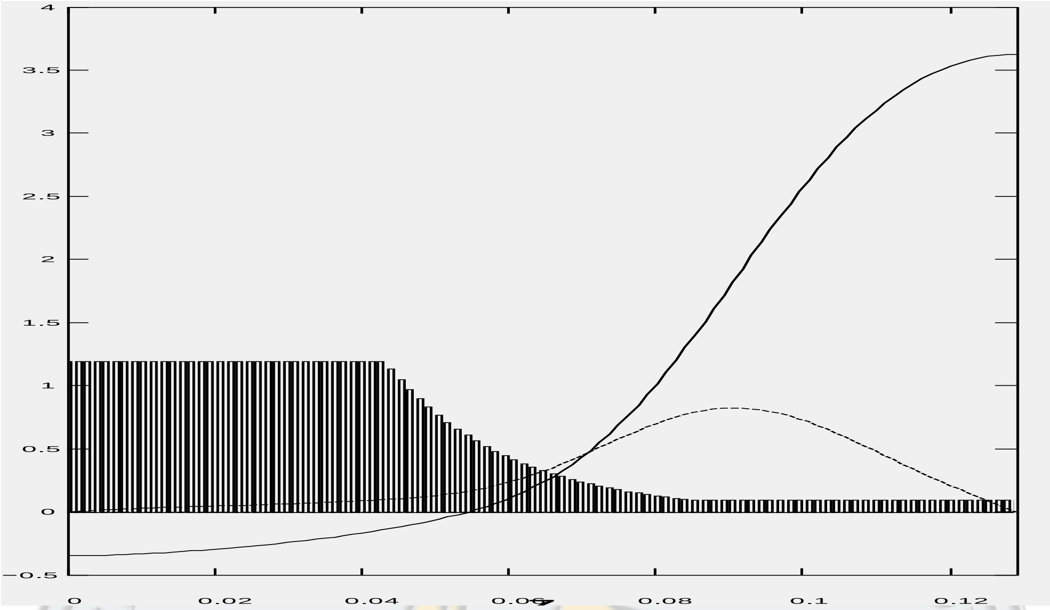

Fig. 3. Resonance body with variable section by step connected by exponential radius.
---- The variation of vibration amplitude of resonance body.
The variation of resonance body section.
- - - The variation of mechanical tensions in resonance body.

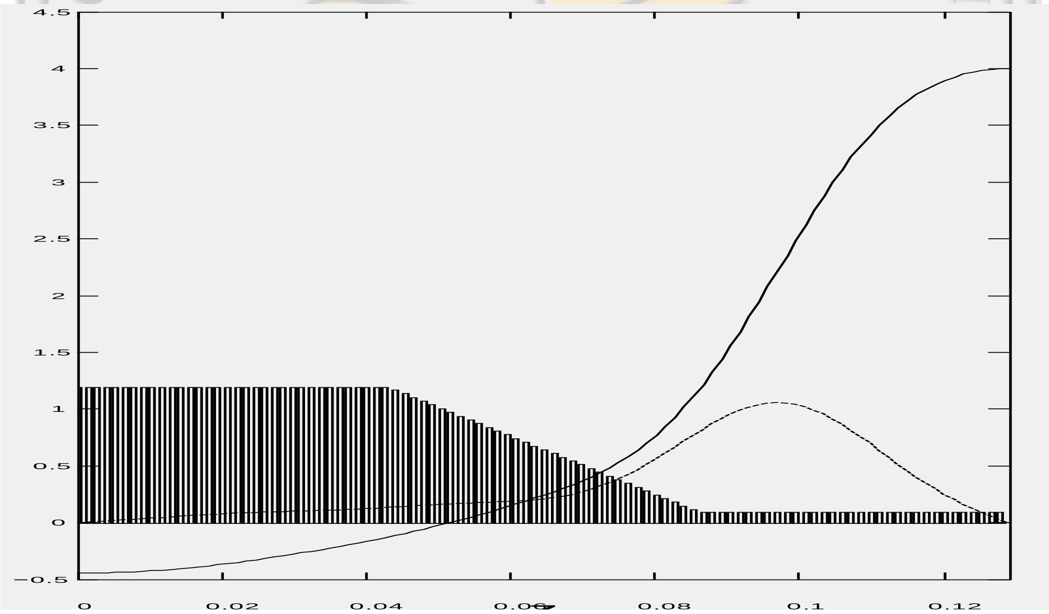

Fig. 4. Resonance body with variable section in the shape of a truncated cone.
---- The variation of vibration amplitude of resonance body.
The variation of resonance body section.
- - - The variation of mechanical tensions in resonance body.

Conclusions

With the method presented in this paper, I have realized and verified the acoustic chain systems. The method has the following advantages:

a) allows to quickly determine the shapes of the variation for: the mechanical tension, the vibration amplitude, the sections areas;

b) allows to follow the influence of different factors on these variation shapes: the material that makes up the acoustic chain, the connection radius and its variation law, the length of elements;

c) allows to expand to more complex shapes of the acoustic chain system with a length of $n \cdot \lambda/2$; n=1, 2, 3.

R E F E R E N C E S

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