R-OSSE
Acoustic Waveguide

White Paper

DRAFT

Parametric curve of the waveguide contour: P(t) = [x(t), y(t)]   t = ⟨0,1⟩

Design parameters

Basic geometry: unit/example

R	outer radius of the waveguide	[mm]/180
L	length of the waveguide contour	[mm]/210
r0	throat radius	[mm]/12.7
a0	throat opening angle	[deg]/0

x(t) parameters:

s	scaling factor	0.8
r	turnover radius	[mm]/40
m	turnover position	0.9
b	bending factor	0.001

y(t) parameters:

u	end radius	[mm]/40
q	throat shape factor	3

Parametric equations

1) auxiliary constants

$$k_1 = r_0^2$$

$$k_2 = 2r_0 \tan(a_0)$$

$$k_3 = (R^2 - k_1 - k_2 L)/L^2$$

$$x_0 = \sqrt{r^2 + (smL)^2}$$

2) auxiliary functions

$$y_1(l) = R + u - \sqrt{u^2 + k_3(l-L)^2}$$

$$y_2(l) = \sqrt{k_1 + k_2 l + k_3 l^2}$$

3) waveguide parametric equations

$$x(t) = x_0 - \sqrt{r^2 + (sL(t-m))^2} - b(tL)^2$$

$$y(t) = t^q y_1(tL) + (1 - t^q) y_2(tL)$$

R-OSSE [x,y]