

R-OSSE
Acoustic Waveguide

White Paper

DRAFT

Parametric curve of the waveguide contour: $P(t) = [x(t), y(t)]$ $t = \langle 0, 1 \rangle$

Design parameters

Basic geometry:		unit/example
R	outer radius of the waveguide	[mm]
L	length of the waveguide contour	[mm]
r0	throat radius	[mm]
a0	throat opening angle	[deg]
x(t) parameters:		
s	scaling factor	0.8
r	turnover radius	[mm]
m	turnover center	0.9
b	bending factor	0.001
y(t) parameters:		
u	end radius	[mm]
q	throat shape factor	3

Parametric equations

1) auxiliary constants

$$k_1 = r_0^2$$

$$k_2 = 2r_0 \tan(\alpha_0)$$

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

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

2) auxiliary functions

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

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

$$w(t) = (t/L)^q$$

3) waveguide parametric equations

$$x(t) = x_0 - \sqrt{r^2 + s^2(t - mL)^2} - bt^2$$

$$y(t) = w(t)y_1(t) + (1 - w(t))y_2(t)$$