

()

*

(// : // :)

($r^2 = 0.97$)

(/ **Hz/cc**)

(/ **Hz/cc**)

Hz/cc

± / **cc**

($r^2 = 0.98$)

()

(.)

()

()

() $(r^2 = 0.97)$

()

5

1

C++

4

3

2

Statistica V.6

(.)

(.)

[]

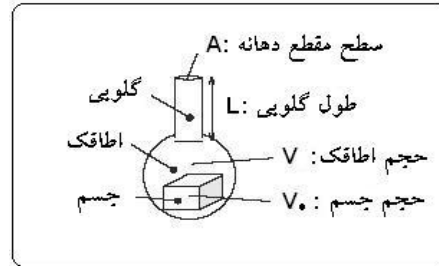
(.)

$$f = \frac{c}{2 \cdot \pi} \sqrt{\frac{A}{(L - L_c) \cdot (V - V_0)}} \quad ($$

5. Standing Waves

-
1. Helmholtz Resonator
 2. Input Lip
 3. Throat
 4. Chamber or Cavity

a V (m/s) f c (Hz)
 (m^3) V_0
 L_c L
 (m^2) A (m)



(V= cc)

(a= / cm)

(L - Lc) ()

V
)

() :

V (M

$$(L - L_c) = L + \frac{16 \cdot a}{3 \cdot \pi} \quad ()$$

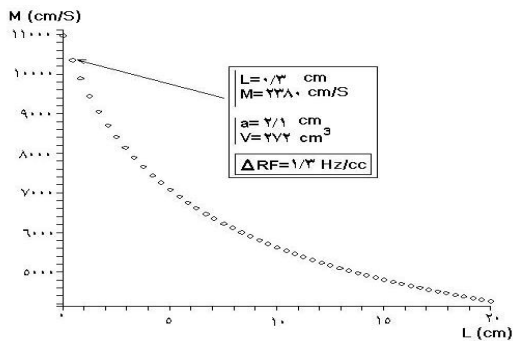
a

$$A = \pi \cdot a^2 \quad ()$$

() ()

M (c= m/s)

:() (L)



) M

(L)

(

$$f = \frac{c}{2 \cdot \pi} \sqrt{\frac{\pi \cdot a^2}{\left(L + \frac{16 \cdot a}{3 \cdot \pi}\right) \cdot (V - V_0)}} \quad ()$$

$$f = \left[\frac{c \cdot a}{2} \sqrt{\frac{3}{3 \cdot \pi \cdot L + 16 \cdot a}} \right] \cdot \sqrt{\frac{1}{(V - V_0)}} \quad ()$$

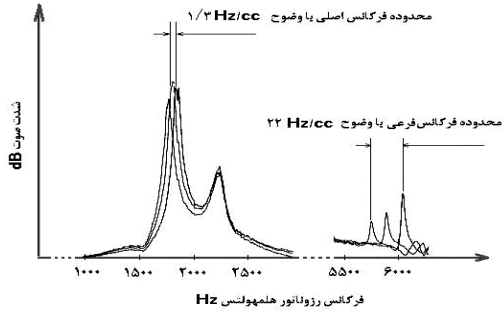
() M

(ΔRf)

)

(Hz Hz

M ()



/ Hz/cc

()

/ Hz/cc

Hz/cc

1

()

2

()



()

()

(Chrystal Sound Fusion tm CS 4281)

1. Maximum Entropy Method (MEM)
2. Fast Fourier Transform (FFT)

/ cc)

Statistica V6.

(/ cc

(Hz

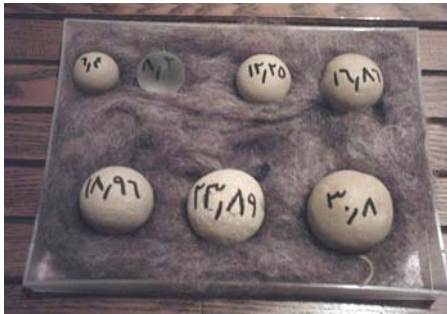
Hz)

()

()

C++

± cc

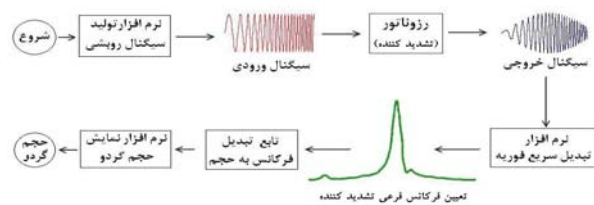


(/ Hz)

(FFT Size = 16384)



2



()

)

$$V = \frac{\pi \cdot d^3}{6}$$

(± / mm

1. Sweep Signal Generator

2. Dynamic Data Exchange (DDE).

$(r^2=0.98)$

() / ()

()

(> cc)

()

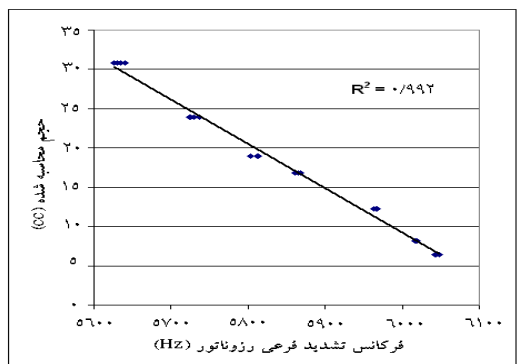
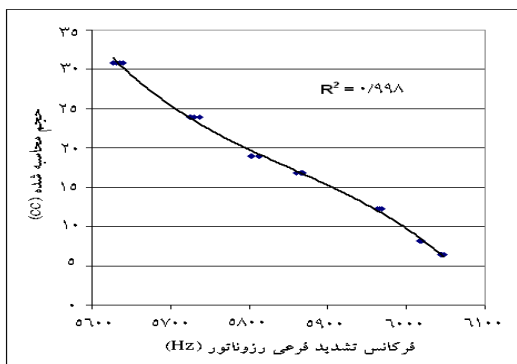
\pm / cc

\pm / cc

$\pm cc$

\pm / cc ()

(f)

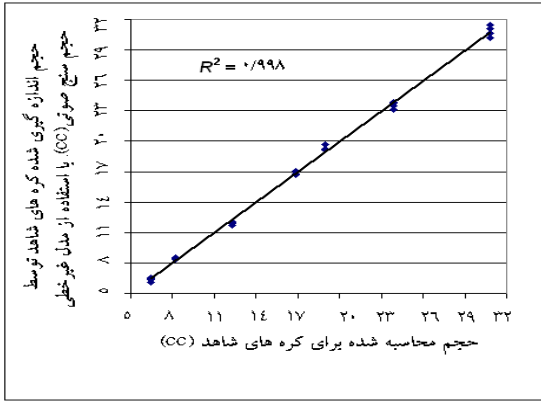


() ()

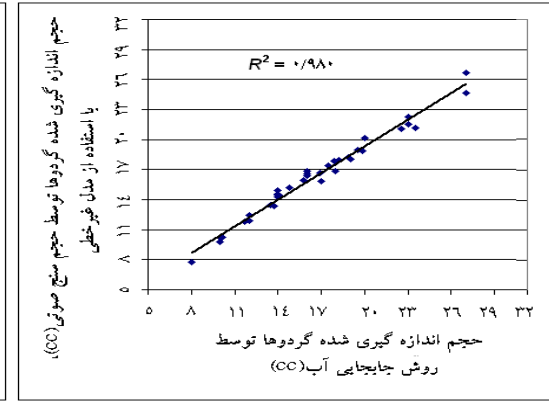
عدم قطعیت پیشینه در تخمین حجم (CC)	شکل مدل	ضرایب مدل		نام مدل
$\pm 1/13$	$Volume = a \cdot F + b$	$a = -0.0564$ $b = 347.679$	0.992	خطی
± 0.48	$Volume = a \cdot F^3 + b \cdot F^2 + c \cdot F + d$	$a = -3.01e-7$ $b = 0.0061$ $c = -36.108$ $d = 70.724/947$	0.998	ضریحخطی

t ()

گروه ۱ (حجم محاسبه شده کره های شاهد) در مقابل گروه ۲ (حجم کره های شاهد تخمین زده شده توسط حجم سنج صوتی)										
میانگین گروه ۱	میانگین گروه ۲	مقدار t	درجه آزادی	مقدار P	تعداد نمونه های گروه ۱	تعداد نمونه های گروه ۲	انحراف معیار گروه ۱	انحراف معیار گروه ۲	نسبیت F	واریانس P
16.7657	16.7657	0.0000	52	1.000	28	28	8.198930	8.190449	1.00407	0.9907



()



()

CC

CC

()

Hz

/

Hz

FFT

/

1

2

1. Sweeping Time
2. Repeatability

cc

± / cc

± /

± / cc

1

()

± / cc

± / cc

± / cc

cc

1. White Noise

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