

restart;

Equ 4.6-1, where s is the scale length

$$x := n \rightarrow s \cdot \left(1 - \frac{1}{2^{\frac{n}{12}}} \right)$$

$$n \rightarrow s \left(1 - \frac{1}{2^{\frac{1}{12} n}} \right) \quad (1)$$

Equ. 4.7-13

$$y_c := n \rightarrow 0.5 \cdot \text{sqrt}(4 \cdot R^2 - l^2 - 4 \cdot x(n)^2 + 4 \cdot l \cdot x(n)) - \text{sqrt}(R^2 - 0.25 \cdot l^2)$$

$$n \rightarrow 0.5 \sqrt{4 R^2 - l^2 - 4 x(n)^2 + 4 l x(n)} - \sqrt{R^2 + (-1) \cdot 0.25 l^2} \quad (2)$$

Equ. 4.7-14

$$R := \frac{1}{2} \cdot \left(\frac{p_m \cdot q_m}{h_m} + h_m \right)$$

$$\frac{1}{2} \frac{p_m q_m}{h_m} + \frac{1}{2} h_m \quad (3)$$

Equ 4.7-17

$$b := \frac{h_m}{\text{sqrt}\left(1 - \frac{(x_m - a)^2}{a^2}\right) - \frac{x_m}{a}}$$

$$\frac{h_m}{\sqrt{1 - \frac{(x_m - a)^2}{a^2}} - \frac{x_m}{a}} \quad (4)$$

Equ 4.7-18

$$h_e := n \rightarrow b \cdot \left(\text{sqrt}\left(1 - \frac{(x(n) - a)^2}{a^2}\right) - \frac{x(n)}{a} \right)$$

$$n \rightarrow b \left(\sqrt{1 - \frac{(x(n) - a)^2}{a^2}} - \frac{x(n)}{a} \right) \quad (5)$$

Equ 4.7-21

$$y_l := n \rightarrow \left(\frac{h_{18} - h_0}{x(18) - x(0)} \right) \cdot x(n) + h_0$$

Equ 4.7-22

$$d := n \rightarrow \alpha \cdot y_c(n) + (1 - \alpha) \cdot h_e(n) + \beta \cdot y_l(n)$$

$$n \rightarrow \alpha y_c(n) + (1 - \alpha) h_e(n) + \beta y_l(n) \quad (6)$$

Equ 4.7-23

$$L := n \rightarrow l_1(n) + l_2(n) + l_3(n)$$

$$n \rightarrow l_1(n) + l_2(n) + l_3(n) \quad (7)$$

Equ 4.7-24

$$dL := n \rightarrow L(n) - L_s$$

$$n \rightarrow L(n) - L_s \quad (8)$$

Equ 4.7-25

$$l_1 := n \rightarrow \text{sqrt}(x(n-1)^2 + d(n-1)^2)$$

$$n \rightarrow \sqrt{x(n-1)^2 + d(n-1)^2} \quad (9)$$

Equ 4.7-26

$$l_3 := n \rightarrow \text{sqrt}((L_1 - x(n))^2 + d(n)^2)$$

Equ 4.7-27

$$l_2 := n \rightarrow 2 \cdot \text{sqrt}(f(n)^2 + g(n)^2)$$

$$n \rightarrow 2 \sqrt{f(n)^2 + g(n)^2} \quad (10)$$

Equ 4.7-29

$$g := n \rightarrow g_0 \cdot \left(\frac{x(n) - x(n-1)}{x(1)} \right) \cdot F_p$$

Equ 4.7-30

$$f := n \rightarrow \frac{\text{sqrt}((x(n) - x(n-1))^2 + (d(n) - d(n-1))^2)}{2}$$

$$n \rightarrow \frac{1}{2} \sqrt{(x(n) - x(n-1))^2 + (d(n) - d(n-1))^2} \quad (11)$$

Equ 4.7-31

$$dT := n \rightarrow \frac{k \cdot dL(n)}{L_p}$$

$$n \rightarrow \frac{k \cdot dL(n)}{L_p} \quad (12)$$

Equ 4.7-33, where f_1 is the frequency of the open string

$$fr := n \rightarrow f_1 \cdot 2^{\frac{n}{12}}$$

$$n \rightarrow f_1 \cdot 2^{\frac{1}{12} n} \quad (13)$$

Equ 4.7-34, where s is the scale length

$$\mu := \frac{T}{4 \cdot f_1^2 \cdot s^2}$$

$$\frac{1}{4} \frac{T}{f_1^2 s^2} \quad (14)$$

Equ 4.7-35

$$L_c := n \rightarrow \frac{1}{2 \cdot fr(n)} \cdot \text{sqrt}\left(\frac{T + dT(n)}{\mu}\right)$$

$$n \rightarrow \frac{1}{2} \frac{\sqrt{\frac{T + dT(n)}{\mu}}}{fr(n)} \quad (15)$$

Equ 4.7-36, where u is the intonation error length and s is the scale length

$$u := n \rightarrow L_c(n) - ((s - dN + dS) - x(n))$$

$$n \rightarrow L_c(n) - s + dN - dS + x(n) \quad (16)$$

Assigning values to variables

$$s := 650 \cdot 10^{-3}$$

$$\frac{13}{20} \quad (17)$$

$$l := x(18)$$

$$\frac{13}{20} - \frac{13}{80} \sqrt{2} \quad (18)$$

$$h_m := 0.4 \cdot 10^{-3}$$

$$0.00040000000000 \quad (19)$$

$$p_m := x(7) - x(1)$$

$$-\frac{13}{40} 2^{5/12} + \frac{13}{40} 2^{11/12} \quad (20)$$

$$q_m := x(18) - x(7)$$

$$-\frac{13}{80} \sqrt{2} + \frac{13}{40} 2^{5/12} \quad (21)$$

$$x_m := x(7)$$

$$\frac{13}{20} - \frac{13}{40} 2^{5/12} \quad (22)$$

$$a := x(18)$$

$$\frac{13}{20} - \frac{13}{80} \sqrt{2} \quad (23)$$

$$h_{l8} := 2 \cdot 10^{-3}$$

$$\frac{1}{500} \quad (24)$$

$$h_0 := 0.1 \cdot 10^{-3}$$

$$0.00010000000000 \quad (25)$$

$$\alpha := 0.5$$

$$0.5 \quad (26)$$

$$\beta := 1$$

$$1 \quad (27)$$

$$L_s := s + dS - dN$$

$$\frac{13}{20} \quad (28)$$

$$L_l := s$$

$$\frac{13}{20} \quad (29)$$

$$g_0 := 0.5 \cdot 10^{-3}$$

$$F_p := 0.75 \qquad \qquad \qquad 0.0005000000000 \qquad \qquad \qquad (30)$$

$$f_l := 329.63 \qquad \qquad \qquad 0.75 \qquad \qquad \qquad (31)$$

$$L_p := L_s + 40 \cdot 10^{-3} \qquad \qquad \qquad 329.63 \qquad \qquad \qquad (32)$$

$$T := 10570 \cdot 10^{-3} \cdot G \qquad \qquad \qquad \frac{69}{100} \qquad \qquad \qquad (33)$$

$$G := 9.80665 \qquad \qquad \qquad 103.6562905 \qquad \qquad \qquad (34)$$

$$k := 210 \cdot 10^9 \cdot \left(\frac{0.012}{2} \cdot 25.4 \cdot 10^{-3} \right)^2 \cdot \text{Pi} \qquad \qquad \qquad 9.80665 \qquad \qquad \qquad (35)$$

$$dN := 0 \cdot 10^{-3} \qquad \qquad \qquad 4877.409600 \pi \qquad \qquad \qquad (36)$$

$$dS := 0 \cdot 10^{-3} \qquad \qquad \qquad 0 \qquad \qquad \qquad (37)$$

$$plot(u(n), n = 0 .. 18) \qquad \qquad \qquad 0 \qquad \qquad \qquad (38)$$

