NAME

mel − generate sound fragments from plain text

SYNOPSIS

mel [[[*wavefile* ...] *infile*] *outfile*]

DESCRIPTION

Interpret ASCII input in *infile* as audio and save it to*outfile* in the W AVE format, optionally using samples provided in *wavefile*s. The syntax for *infile* is given below. Filenames default to **/dev/stdin** or **/dev/stdout**. The dash (**-**) is a shorthand for the default value.

SYNTAX

infile shall contain words *w* (sequences of lowercase letters **a** to **z** and hashes #), numbers *n* (sequences of digits **0** to **9**, decimal points **.**, and a dividing colon **:**), and commands (other single ASCII characters). Commands are followed by words and/or numbers as arguments, as listed below. The input is processed linearly, whereby unexpected characters, including whitespace, act as separators and are otherwise ignored.

~*w*[*n*] Choose wave sample of shape*w* and dur ation *n* in seconds. This is the building block for sound at arbitrary frequency and amplitude. Predefined values for *w* are listed below. The corresponding spectra are shown by the command **harmonics** *w*. If*w* reads #, the first channel of the*n*th *w avefile* given on the command line is loaded instead. *n* def aults to **1**. The default is a **circular** wave that lasts **1** second.

harmonic
sin(x) for x in (0, 2π]

power $\sin^3(x)$ for x in (0, 2π]

major sin(x) for x in (0, 2π]

constant
sgn(sin(x)) for x in (0, 2π]

linear $2/\pi \arcsin(\sin(x))$ for x in (0, 2π]

quadratic
$\mathrm{sgn}(x)\ (2|x| - x^2)$ for x in (−2, 2]

circular
$\mathrm{sgn}(x)\ \mathrm{sqrt}(2|x| - x^2)$ for x in (−2, 2]

cubic $3/2\ \mathrm{sqrt}(3)\ (x^3 - x)$ for x in (−1, 1]

random
White noise if followed by **=** without argument.

S*w*[*n*] Choose attack envelope. Arguments as above. Predefined values for *w* are listed below. The default is a **circular** envelope that lasts **0.1** seconds.

harmonic
sin(x) for x in (0, π/2)

smooth
$\sin^2(x)$ for x in (0, π/2)

power $\sin^3(x)$ for x in (0, π/2)

major sin(x) for x in (0, π/2)

linear x for x in (0, 1)

quadratic
$1 - x^2$ for x in (−1, 0)

circular
sqrt(1 − x²) for x in (−1, 0)

cubic 3x² − 2x² for x in (0, 1)

Z*w*[*n*] Choose release envelope. Arguments as above.

N*w*[*n*] Choose attack and release envelope at once. Arguments as above.

***** Start/end a comment.

$*n* Set a sample rate of*n* samples per second. The def ault is **44100** samples per second. This setting holds globally and is ignored after first note played.

O*n* Set number of channels to*n*. Allo wed values are **1** (mono) and **2** (stereo). By default, the number of channels is determined automatically.

|*n* Set duration of a beat to*n* seconds . The default is **0.5** seconds.

@n Set concert pitch **A4** to *n* Hz. The default is **440** Hz.

T*w* Choose tuning from the below options.

equal Equal temperament.

pyth Pythagorean tuning. All notes are reached combining fifths and octaves.

just Just intonation. All notes are reached combining thirds, −1 to 2 fifths from keynote, and octaves.

close Five-limit tuning closest to twelve-tone equal temperament.

H*n* Divide one octave into*n* halftones/steps of equal frequency r atio. The default is **12** halftones (twelve-tone equal temperament).

=[*n*] Set reference frequency to*n* Hz. *n* def aults to the inverse length of the current wave sample. The default is the concert pitch **A4**.

&*n* Set reference amplitude sqrt(L² + R²) to*n* arb . units. The default is **1** arb. unit.

%*n* Set reference amplitude ratio R:L between right and left channel to*n*. The def ault is **1**.

C D E F G A B[*w*][*n*[*n'*]]
Set reference frequency via note name. *w* marks accidentals and can be **#**, **x**, **b**, **bb**, and so on. To raise and lower the frequency by a diatonic (septimal) [eleven] {Pythagorean} comma 81:80 (64:63) [33:32] {531441:524288}, use **u** and **v** (**s** and **z**) [**i** and **j**] {**p** and **d**}, respectively. Please note that the note name already implies a certain number of diatonic commas for the tunings **just** and **close**. *n* is the octave number and defaults to **4**. If omitted, also set the keynote. *n'* is an optional microtonal accidental as used in the Functional Just System (FJS) by misotanni (*https://misotanni.github.io/fjs*). Here, compound accidentals must be written as a product and otonal and utonal accidentals are separated by a colon (**:**). **A4** is the concert pitch.

'[*n*] Play sound for a duration of*n* beats . *n* defaults to **1**.

"[*n*] Pause for a duration of*n* beats . *n* defaults to **1**.

`[*n*] Rewind by *n* beats. *n* defaults to **1**. (Negative pause.)

Q*n* Set frequency to*n* times the ref erence frequency.

V U[*w*]*n*
Set frequency to*n* chromatic steps belo w/above the reference. You can use the same commas *w* as with note names. The 12-tone scale is made of the −5 to 6th fifths from the keynote.

− +*n* Set frequency to*n* halftones belo w/above the reference.

\ /*n* Continuously lower/raise frequency by *n* halftones during the next play period (**'**).

_ ^*n* Continuously lower/raise frequency by *n* halftones per beat from now on.

? !*n* Set amplitude to*n* dB belo w/above the reference.

< >*n* Continuously lower/raise amplitude by *n* dB during the next play period (**'**).

, ;*n* Continuously lower/raise amplitude by *n* dB per beat from now on.

[ ]*n* Set amplitude ratio to*n* dB belo w/above the reference.

( )*n* Continuously lower/raise amplitude ratio by *n* dB during the next play period (**'**).

{ }*n* Continuously lower/raise amplitude ratio by *n* dB per beat from now on.

M[*n*] Set *n*th time mark. *n* m ust be an integer between **0** and **99** and defaults to **0**.

W[*n*] Wind back to*n*th time mark, if set. *n* def aults to **0**.

R[*n*] Forget *n*th time mark. *n* def aults to **0**.

P*n n'*[*n''*]
Paste copy of sound between *n*th and*n'*th time mark*n''* times , if marks have been set. *n''* defaults to **1**.

I[*n*] Set *n*th text mark. *n* m ust be an integer between **0** and **99** and defaults to **0**.

J[*n*[*n'*]]
Jump back to*n*th te xt mark, if set. This works *n'* times in a row. *n* and *n'* default to **0** and **1**, respectively.

K[*n*] Forget *n*th text mark. *n* def aults to **0**.

X*w* [...] Do something special.

report Print note counts (since last report) to standard error stream. Only notes defined via the commands **C D E F G A B** and **U V** are counted. This is useful to, e.g., to determine the keynote of a piece of music.

detune*n*
Randomly detune frequency, including concert pitch **A4**, by up to*n* halftones . In combination with text and time marks, this is useful to generate non-white noise.

vibrato*n n' m m'*
Apply vibrato to sound between *n*th and*n'*th time mark, if marks ha ve been set. The sample is periodically delayed (and advanced) with an amplitude of*m* seconds and a frequency of*m'* per sample length, using the current w ave sample.

flanger*n n' m m'*
Apply flanger to sound between *n*th and*n'*th time mark, if marks ha ve been set. The sample is periodically delayed (and advanced) with an amplitude of*m* seconds and a frequency of*m'* per sample length, using the current w ave sample, and superimposed with itself.