$\LaTeX$ Document Test Page (class aritcle 11pt)

duangsuse (maketitle, title, author)

March 10, 2019 with amsmath,amssymb,tikz,hyperref,caption,$\cdots$

1 Made by duangsuse with love and $\LaTeX\,2_\varepsilon$

$$Y = (lambda)\lambda f.(\lambda x.f(xx))(\lambda x.f(xx)) \tag{1}$$

$$Matrix_0 = \begin{Bmatrix} 1 & 9 & 3 & 5 & 10 \\ 3 & \mathbf{5} & 9 & 4 & 71 \\ 2 & 3 & 1 & 9 & 34 \\ 9 & 4 & 3 & 2 & 29 \\ 2 & 8 & 4 & 3 & 12 \end{Bmatrix} (beginequation, mathbf, Bmatrix) \tag{2}$$

$$Matrix_{022}(equiv) \equiv 5 \tag{3}$$

$$(sum, dash_sub, accent^sup) \sum_{i=2}^{4} \sum_{j=1}^{4} Matrix_{0ij} \tag{4}$$

2 Made by others with unbelievable IQ

$$x = -b(pm) \pm (sqrt)\sqrt{b^2 - 4ac}(frac)\frac{2}{a}. \tag{5}$$

$$d_i = (displaystyle)\sum_{j=1}^{n} a_{ij} \tag{6}$$

$$(sigma)\sigma = \sqrt{\frac{1}{N}\sum_{i=1}^{N}(x_i - (mu)\mu)^2} \tag{7}$$

$$((nabla)\nabla_X Y)^k = X^i(\nabla_i Y)^k = X^i(left)\left(\frac{(partial)\partial Y^k}{\partial x^i} + (Gamma)\Gamma^k_{im}Y^m(right)\right) \tag{8}$$

$$(vec)\vec{\nabla}(times) \times \vec{F} = \left(\frac{\partial F_z}{\partial y} - \frac{\partial F_y}{\partial z}\right)(mathbf)\mathbf{i} + \left(\frac{\partial F_x}{\partial z} - \frac{\partial F_z}{\partial x}\right)\mathbf{j} + \left(\frac{\partial F_y}{\partial x} - \frac{\partial F_x}{\partial y}\right)\mathbf{k} \tag{9}$$

$$f(x) = \begin{cases} (begincases)0 & x(leq) \leq 0 \\ \frac{100-x}{100} & 0 \leq x \leq 100 \\ 0 & 100 \leq x \end{cases} \tag{10}$$

$$z = (overbrace)\overbrace{(underbrace)\underbrace{x}_{\text{real}} + i \underbrace{y}_{\text{imaginary}}}^{\text{complex number}} \tag{11}$$

$$C_n^i = \frac{n!}{i!(n-i)!} \tag{12}$$

$$B_{i,n}(t) = C_n^i (1-t)^{n-i} t^i \tag{13}$$

$$R(t) = \sum_{i=0}^{n} R_i B_{i,n}(t), (quad) \quad 0 \leq t \leq 1 \tag{14}$$

3 λ - 算子 (section)

(textit) formal system italic (textbf) **黑体 bold**
(textsc) Hello 小体大写 (textsf) World
(textsl) slanted goodbye (texttt) `science`
(textup) Sample (textmd) Hello

math (begin center)

$(mathbb)\mathbb{Z}^{+}(\mathbb{N})\mathbb{Z}\mathbb{Q}\mathbb{R}\mathbb{C}$
λ (lambda) U (U) Γ (Gamma) $\emptyset$ (emptyset) (pagebreak) (bigskip)
(Gamma vdash lambda x. x) $\Gamma \vdash \lambda x.x$

$$(forall)\forall x(in) \in \mathbb{Z}_{+}.x \in A \wedge x \geq 2$$

$$(beacuse) \because 2 = (-1) + 3 \quad (therefore) \therefore p$$

$$2n = (-1) + (2n+1), 2n+1 \in \mathbb{P} \tag{15}$$

$$(exists)\exists n_0 \in \mathbb{N}_{+}, 2n_0(notin) \notin A \tag{16}$$

3.1 (subsection) lambda calculus

(f(x) = x) $f(x) = x$ (f) f (lambda) λ

$$\Gamma(vdash) \vdash (\lambda x.x)(\lambda y.y)$$

$$(\lambda x.x)(\lambda y.y) = (beta)\beta\lambda y.y$$

$$(\lambda xy.x)(\lambda a.a)(\lambda b.b)(equiv) \equiv (\lambda x.\lambda y.x)(\lambda a.a)(\lambda b.b) =_\beta (\lambda y.(\lambda a.a))(\lambda b.b) =_\beta \lambda a.a$$

$$\beta - reduction(alpha)\alpha - X$$

$$(\lambda x.x)(\lambda x.x) =_\alpha (\lambda x.x)(\lambda y.y)$$

4 Hello World

$$\cos(+) = \cos() \cos() \sin() \sin() \tag{17}$$

$$f(a) = \frac{1}{2(pi)\pi i}(oint) \oint \frac{f(z)}{z-a} dz \tag{18}$$

$$(int) \int_D (\nabla(cdot) \cdot F) dV = \int_{\partial D} F \cdot n dS \tag{19}$$

$$(\nabla_X Y)^k = X^i (\nabla_i Y)^k = X^i \left(\frac{\partial Y^k}{\partial x^i} + \Gamma^k_{im} Y^m \right) \tag{20}$$

一条 n 次 Bézier 曲线可以表示为：$R(t) = \sum_{i=0}^n R_i B_{i,n}(t), \quad 0 \leq t \leq 1$

(paragraph) Bezier **曲线**

> (label helo begin quote) R_i 是控制顶点， 我们可以看出， 一条 n 次 Bézier 曲线有 $n+1$ 个控制顶点， 即 n 次 $n+1$ 阶曲线，$B_{i,n}(t)$ 是 Bernstein 基函数

$$B_{i,n}(t) = C_n^i (1-t)^{n-i} t^i \tag{21}$$

$$C_n^i = \frac{n!}{i!(n-i)!} \tag{22}$$

(hypertarget helo) hello (ref helo) 4

- (begin itemize) (item) 从几何意义上看， 当参数 $t = 0$ 时， 对应的是曲线的第 0 个控制顶点; 而当参数 $t = 1$ 时， 对应的是曲线的第 n 个控制顶点 。 这就是 Bézier 曲线的端点插值特性， 即 $R(0) = R_0, R(1) = R_1$
- 由于二项式系数的对称特性 $C_n^i = C_n^{n-i}$， Bézier 曲线控制顶点的也具有几何地位上的对称性， 即 $\sum_i R_i B_{i,n}(t) = \sum_i R_{n-i} B_{i,n}(t)$

4.1 时间线

(begin tabular) 全局名称 (and)	类型	格式	解释 (newline)(hline)
owner	Integer	Int32	时间线所属人
type	SmallInt	Int16	时间线类型
data	Integer	Int32	时间线数据
created	TimeStamp	Date	时间线发布（创建）时间 (end tabular)

$\mu' = \frac{1s}{3.2731\mu s}$
$(approx) \approx 305530.094714329pps$

$$t_2\% = \frac{n \cdot t_b}{n \cdot t_b} = 100\% \tag{23}$$

$$(limlimits) \lim_{n(to)\to+(infty)\infty} \frac{t_b}{t_b + n \cdot t_e} = 0 = 0\% \tag{24}$$

$$\begin{aligned}
\lim_{n\to+\infty} k &= \lim_{n\to+\infty} [\frac{t_b}{n \cdot (t_b + t_e)} + \frac{n \cdot t_e}{n \cdot (t_b + t_e)}] & (25)\\
&= \lim_{n\to+\infty} \frac{t_b}{n \cdot (t_b + t_e)} + \lim_{n\to+\infty} \frac{n \cdot t_e}{n \cdot (t_b + t_e)} & (26)\\
&= 0 + \frac{t_e}{t_b + t_e} & (27)\\
&= \frac{t_e}{t_b + t_e} & (28)\\
& & (29)
\end{aligned}$$

(newcommand matr [1] lbrace mathbf sharp1 rbrace)

$$(matr)\mathbf{R}x = \mathbf{b} \tag{30}$$

$$(labelorigh)(hat)\hat{h}(t) = \sum_{k=1}^{L} a_k(t_a^i)(cos)\cos(2\pi k f_0(t_a^i)(t - t_a^i) + (phi)\phi_k(t_a^i)) \tag{31}$$

$\mathbf{b}$ in (30) is a $(2L + 1) \times 1$ vector with elements b_k as

$$r_{ik} = r_l = \sum_{t=-N}^{N} w_{2N+1}^2(t)e^{-j2\pi t f_0 l}(mid) \mid_{l=k-i,-2L\leq l\leq 2L} \tag{32}$$

$$\{a_k^*(t_a^i), \phi_k^*(t_a^i)\} = (underset)(undersetof)(arg)\arg(min)\min_{a_k(t_a^i),\phi_k(t_a^i)} \sum_{t=t_a^i-N}^{t_a^i+N} \left(w_{2N+1}(t)(s(t) - \hat{h}(t))\right)^2 \tag{33}$$

Figure 1: (begin figure, centering, caption)estimated parameters of harmonics

ref to rl (32) (cite hua-2014) [1]
(tips: use (input file) to reference external input file to processed by TEX)

5 Greek character (alphabet)

letter	name	IPA	Approximate western European equivalent
A α	alpha	[a]	f(uline)ather
B β	beta	[b]	vote
$\Gamma\gamma$	gamma	[γ] [j], [ŋ] [jn]	yellow
$\Delta\delta$	delta	[ð]	then
$(E)\epsilon\varepsilon$	epsilon	[e]	pet
$Z\zeta$	zeta	[z]	zoo
$H\eta$	eta	[i]	machine
$\Theta\theta\vartheta$	theta	[θ]	thin
$I\iota$	iota	[i], [ç], [j], [jn]	i
$K\kappa$	kappa	[k] [c]	k
$\Lambda\lambda$	lambda	[l]	lantern
$M\mu$	mu	[m]	music
$N\nu$	nu	[n]	net
$\Xi\xi$	xi	[ks]	fox
Oo	omicron	[o]	soft
$\Pi\pi\varpi$	pi	[p]	top
$P\rho\varrho$	rho	[r]	r in
$\Sigma\sigma\varsigma$	sigma	[s] [z]	muse
$T\tau$	tau	[t]	coat
$\Upsilon\upsilon$	upsilon	[i]	i
$\Phi\phi$	phi	[f]	five
$X\chi$	chi	[x] [ç]	Scottish loch
$\Psi\psi$	psi	[ps]	lapse
$\Omega\omega$	omega	[o]	soft

6 Operators

$(oplus) \oplus (ominus) \ominus (perp) \perp (cap) \cap (cup) \cup (vee) \vee (ni) \ni$
$(sum) \sum (prod) \prod (coprod) \coprod (int) \int (oint) \oint (sqsupset) \sqsupset (subsetneq) \subsetneq (nsubseteq) \nsubseteq (nsupseteq) \nsupseteq$

$(varsupsetneq) \varsupsetneq (supset) \supset (sqsupseteq) \sqsupseteq (star) \star (ast) *$
$(rightleftharpoons) \rightleftharpoons (rightarrow) \rightarrow (Leftrightarrow) \Leftrightarrow (circlearrowleft) \circlearrowleft (nRightarrow) \nRightarrow (Rightarrow) \Rightarrow$

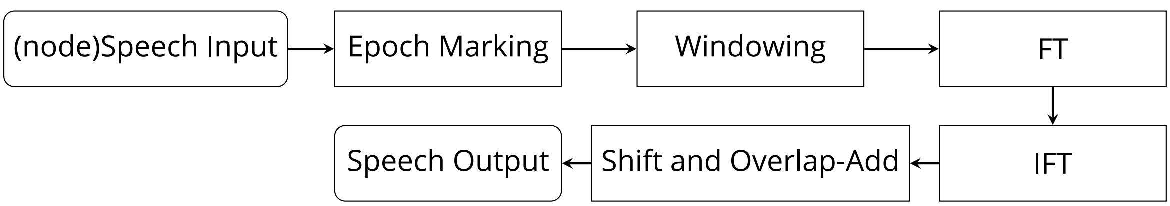
$cdots \cdots vdots \vdots ddots \ddots aleph \aleph flat \flat sharp \sharp bigstar \bigstar$
$(complement) \complement (backslash) \backslash (Bbbk) \Bbbk (varnothing) \varnothing (nexists) \nexists (infty) \infty (surd) \surd (top) \top (bot) \bot (neg) \neg (hslash) \hslash (emptyset) \emptyset$

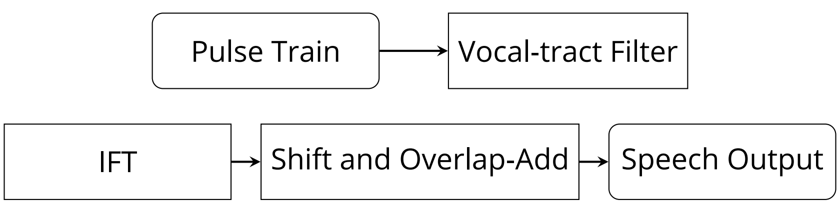
7 Introduction . Reunderstand PSOLA

7.1 PSOLA as a Source-Filter Model

What leaves me wondering is: seems like there's always a blind spot in all tutorials, slides and papers about PSOLA. In a few sentences they tell you something like, [1]

Tikzpicture [node distance = xcm]
node (name) [type: start|process(right|below = float| of=name)] text;
draw [type: arrow] (name) -- (name);





References

[1] (begin thebibliography 99 bibitem hua-2014) Hua, Kanru. ``A method to improve the extraction quality of periodic component of speech". Patent Application. CN201410457379. 2014.

[1] (footnote)A much more detailed yet easy-to-understand video introduction can be found on Professor Simon King's website, (url)http://www.speech.zone/td-psola-the-hard-way/