

# Virtual dubber

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# Outline

虛擬配音員

## ● Action item

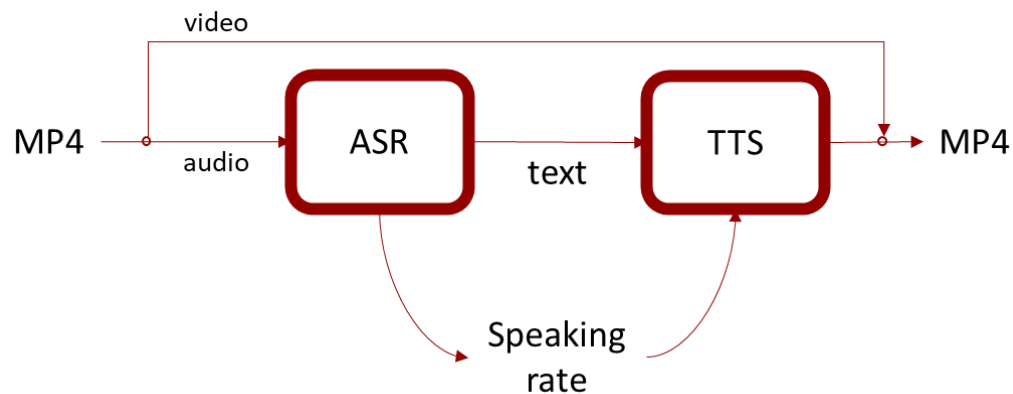
- ▣ Speaking rate control

## ● Demo link

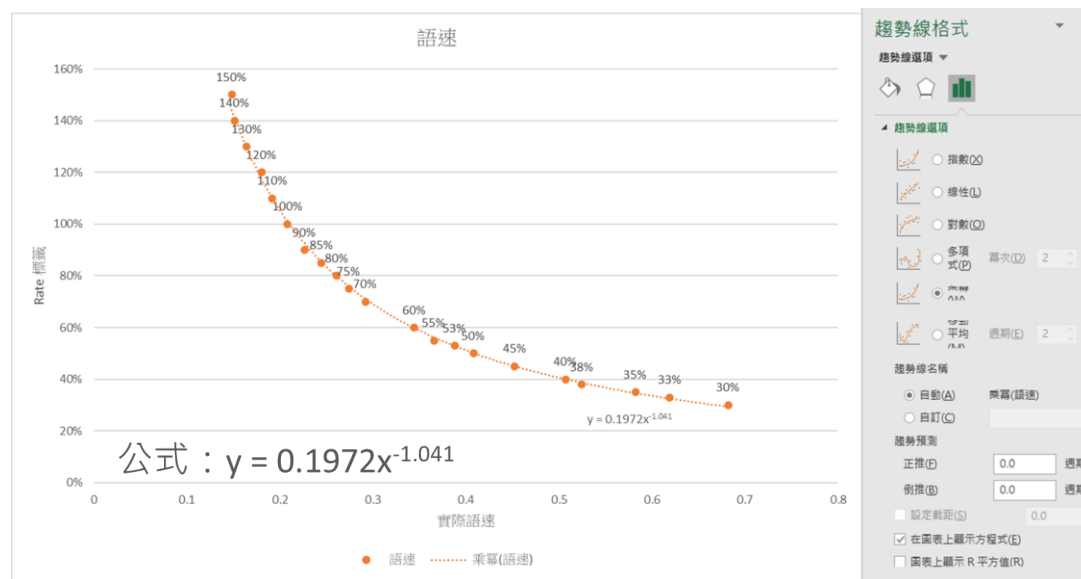
- ▣ Test sequence 王進賢教授：<https://youtu.be/PR23ZwADHeQ>

## ● Speaking rate control method

1. 利用 TTS 提供的百分比語速 (e.g., 90%, 100%, 110%) 合成語音用於模擬實際音檔
2. 利用 ASR 提供 “計算每個字聲音持續的時間” 的功能計算 TTS 合成出來的語音速度
3. 將合成語音語速與提供的百分比製成表格
4. 利用 excel 將表格內容繪製成散佈圖
5. 選擇乘冪趨勢線並算出曲線方程式
  - 公式： $y = 0.1972x^{-1.041}$
6. 利用此公式將文字標上速度標籤



(圖一) Virtual dubber 架構



(圖二) 實際語速與 TTS 提供語速的曲線

# 附錄

比較影片(下方三個合併)：

<https://youtu.be/PR23ZwADHeQ>

1. 原始影片：

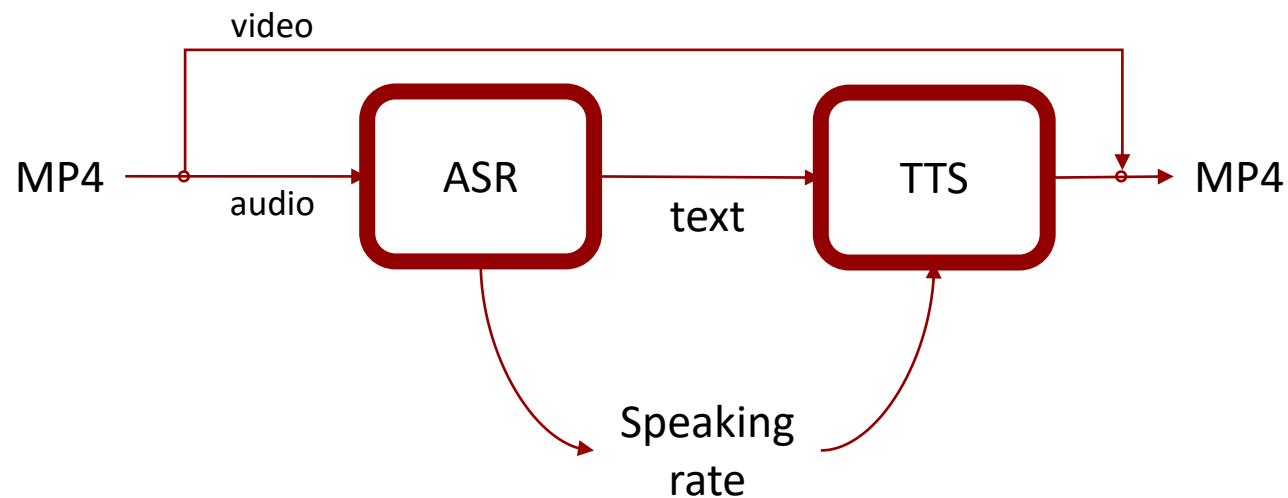
<https://www.youtube.com/watch?v=iCByLYHNXYBY>

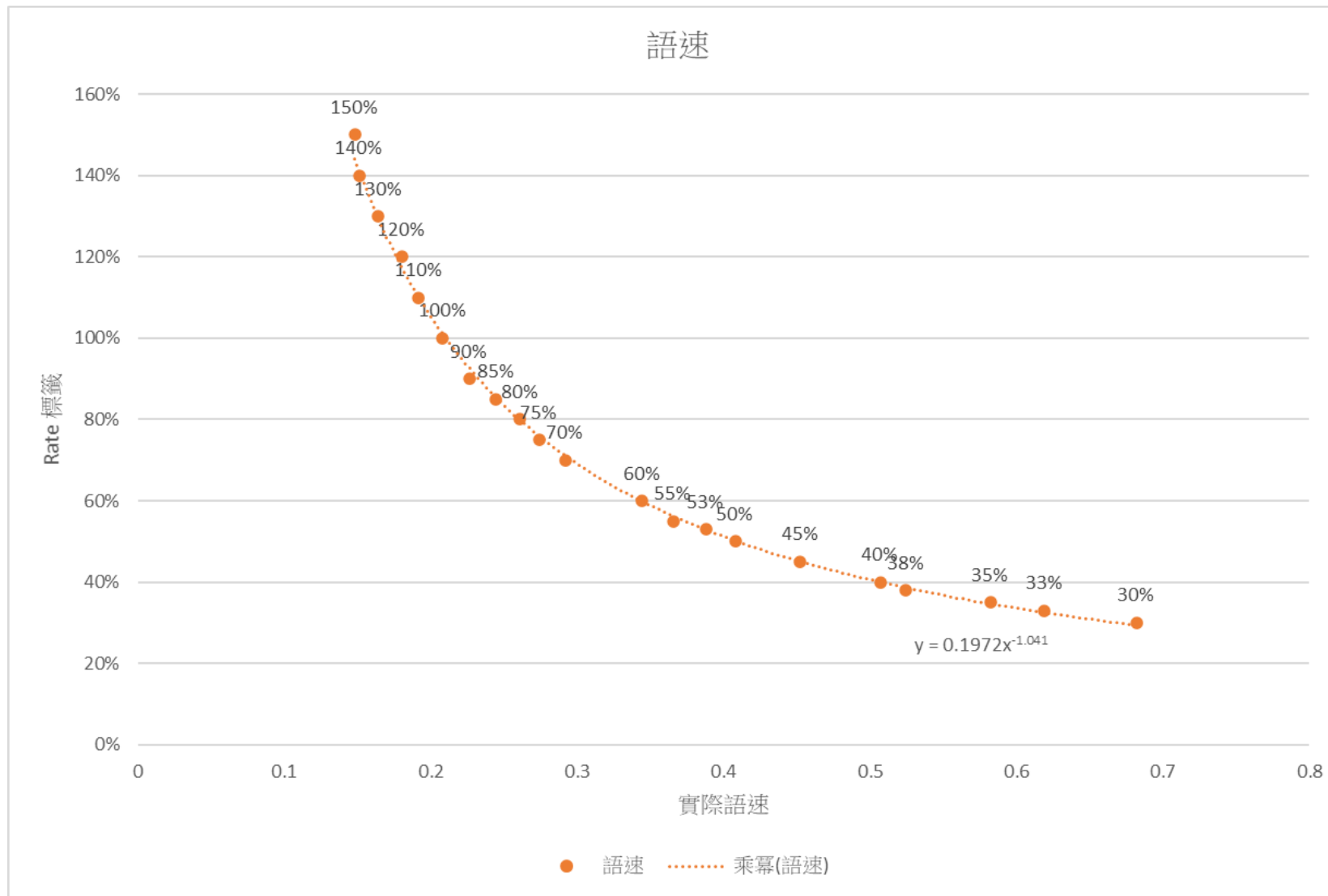
2. 無語速控制：

<https://youtu.be/Mc5tR1iT1ok>

3. 有語速控制：

<https://youtu.be/lr9sWqus-dM>





### 趨勢線格式

趨勢線選項 ▾

趨勢線選項 ▴

- ☐ 指數(X)
- ☐ 線性(L)
- ☐ 對數(O)
- ☐ 多項式(P) 冪次(D) 2
- ☒ 乘幂(M)
- ☐ 平均 (A) 週期(E) 2

趨勢線名稱

☒ 自動(A) 乘幂(語速)

☐ 自訂(C)

趨勢預測

正推(F) 0.0 週期

倒推(B) 0.0 週期

☐ 設定截距(S) 0.0

☒ 在圖表上顯示方程式(E)

☐ 圖表上顯示 R 平方值(R)

公式： $y = 0.1972x^{-1.041}$

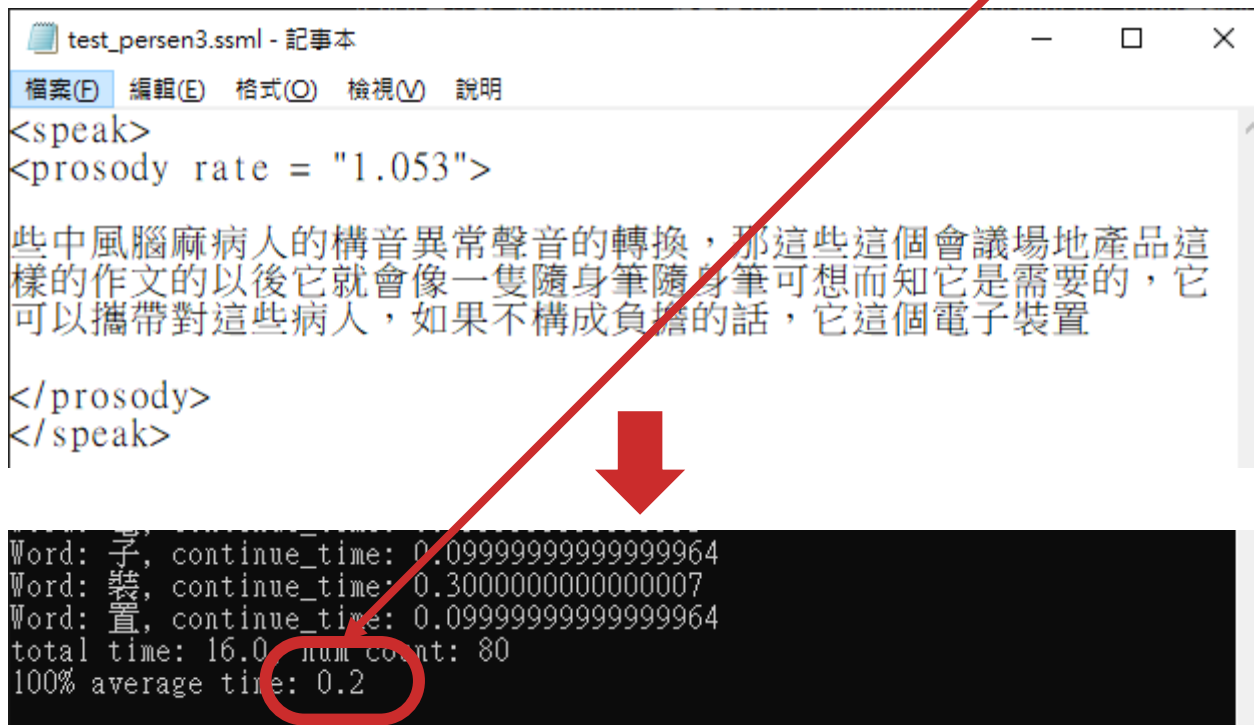
Word: 視, start\_time: 11.1, end\_time: 11.5, continued\_time: 0.40000000000000036  
Word: 全, start\_time: 11.5, end\_time: 11.8, continued\_time: 0.30000000000000007  
Word: 世, start\_time: 11.8, end\_time: 11.9, continued\_time: 0.09999999999999964  
Word: 界, start\_time: 11.9, end\_time: 12.0, continued\_time: 0.09999999999999964  
Word: 的, start\_time: 12.0, end\_time: 12.2, continued\_time: 0.19999999999999993  
Word: 這, start\_time: 12.2, end\_time: 12.3, continued\_time: 0.10000000000000142  
Word: 個, start\_time: 12.3, end\_time: 12.5, continued\_time: 0.19999999999999993  
Word: 研, start\_time: 12.5, end\_time: 12.7, continued\_time: 0.19999999999999993  
Word: 究, start\_time: 12.7, end\_time: 12.7, continued\_time: 0.0  
Word: 者, start\_time: 12.7, end\_time: 13.0, continued\_time: 0.30000000000000007  
Word: 都, start\_time: 13.0, end\_time: 13.2, continued\_time: 0.19999999999999993  
Word: 想, start\_time: 13.2, end\_time: 13.5, continued\_time: 0.30000000000000007  
Word: 要, start\_time: 13.5, end\_time: 13.6, continued\_time: 0.09999999999999964  
Word: 想, start\_time: 13.6, end\_time: 14.0, continued\_time: 0.40000000000000036  
Word: 方, start\_time: 14.0, end\_time: 14.3, continued\_time: 0.30000000000000007  
Word: 設, start\_time: 14.3, end\_time: 14.4, continued\_time: 0.09999999999999964  
Word: 法, start\_time: 14.4, end\_time: 14.6, continued\_time: 0.19999999999999993  
Word: 講, start\_time: 14.6, end\_time: 14.8, continued\_time: 0.20000000000000107  
Word: 這, start\_time: 14.8, end\_time: 15.5, continued\_time: 0.69999999999999993  
Word: 個, start\_time: 15.5, end\_time: 15.7, continued\_time: 0.19999999999999993  
Word: 電, start\_time: 15.7, end\_time: 15.9, continued\_time: 0.20000000000000107  
Word: 壓, start\_time: 15.9, end\_time: 16.1, continued\_time: 0.20000000000000107  
Word: 可, start\_time: 16.1, end\_time: 16.3, continued\_time: 0.19999999999999993  
Word: 以, start\_time: 16.3, end\_time: 16.3, continued\_time: 0.0  
Word: 供, start\_time: 16.3, end\_time: 16.6, continued\_time: 0.30000000000000007  
Word: 電, start\_time: 16.6, end\_time: 16.8, continued\_time: 0.19999999999999993  
Word: 可, start\_time: 16.8, end\_time: 16.9, continued\_time: 0.099999999999999787  
Word: 以, start\_time: 16.9, end\_time: 17.0, continued\_time: 0.10000000000000142  
Word: 第, start\_time: 17.0, end\_time: 17.2, continued\_time: 0.19999999999999993  
Word: 一, start\_time: 17.2, end\_time: 17.3, continued\_time: 0.10000000000000142  
Word: 點, start\_time: 17.3, end\_time: 17.5, continued\_time: 0.19999999999999993  
Word: 可, start\_time: 17.5, end\_time: 18.2, continued\_time: 0.69999999999999993  
Word: 是, start\_time: 18.2, end\_time: 18.2, continued\_time: 0.0  
Word: 空, start\_time: 18.2, end\_time: 18.4, continued\_time: 0.19999999999999993  
Word: 間, start\_time: 18.4, end\_time: 18.5, continued\_time: 0.10000000000000142  
Word: 的, start\_time: 18.5, end\_time: 18.7, continued\_time: 0.19999999999999993  
Word: 一, start\_time: 18.8, end\_time: 18.8, continued\_time: 0.0  
Word: 點, start\_time: 18.8, end\_time: 18.9, continued\_time: 0.099999999999999787  
Word: 以, start\_time: 19.1, end\_time: 19.1, continued\_time: 0.0  
Word: 後, start\_time: 19.1, end\_time: 19.2, continued\_time: 0.099999999999999787  
Word: 來, start\_time: 19.2, end\_time: 19.5, continued\_time: 0.30000000000000007  
Word: 這, start\_time: 19.5, end\_time: 19.7, continued\_time: 0.19999999999999993  
Word: 些, start\_time: 19.7, end\_time: 19.8, continued\_time: 0.10000000000000142  
Word: 平, start\_time: 19.8, end\_time: 20.0, continued\_time: 0.19999999999999993  
Word: 導, start\_time: 20.0, end\_time: 20.1, continued\_time: 0.10000000000000142  
Word: 體, start\_time: 20.1, end\_time: 20.2, continued\_time: 0.099999999999999787  
Word: 的, start\_time: 20.2, end\_time: 20.4, continued\_time: 0.19999999999999993  
Word: 電, start\_time: 20.4, end\_time: 20.5, continued\_time: 0.10000000000000142  
Word: 子, start\_time: 20.5, end\_time: 20.8, continued\_time: 0.30000000000000007  
Word: 元, start\_time: 20.8, end\_time: 20.9, continued\_time: 0.099999999999999787

Word: 件, start\_time: 20.9, end\_time: 21.1, continued\_time: 0.20000000000000284  
Word: 或, start\_time: 21.1, end\_time: 21.4, continued\_time: 0.29999999999999716  
Word: 者, start\_time: 21.4, end\_time: 21.5, continued\_time: 0.10000000000000142  
Word: 積, start\_time: 21.5, end\_time: 21.6, continued\_time: 0.10000000000000142  
Word: 體, start\_time: 21.6, end\_time: 21.8, continued\_time: 0.19999999999999993  
Word: 電, start\_time: 21.8, end\_time: 21.8, continued\_time: 0.0  
Word: 路, start\_time: 21.8, end\_time: 22.1, continued\_time: 0.30000000000000007  
Word: 他, start\_time: 22.1, end\_time: 22.7, continued\_time: 0.5999999999999979  
Word: 會, start\_time: 22.7, end\_time: 22.9, continued\_time: 0.19999999999999993  
Word: 有, start\_time: 22.9, end\_time: 23.0, continued\_time: 0.10000000000000142  
Word: 兩, start\_time: 23.0, end\_time: 23.3, continued\_time: 0.30000000000000007  
Word: 個, start\_time: 23.3, end\_time: 23.3, continued\_time: 0.0  
Word: 困, start\_time: 23.3, end\_time: 23.6, continued\_time: 0.30000000000000007  
Word: 難, start\_time: 23.6, end\_time: 23.7, continued\_time: 0.099999999999999787  
Word: 點, start\_time: 23.7, end\_time: 24.0, continued\_time: 0.30000000000000007  
Word: 漏, start\_time: 24.0, end\_time: 25.2, continued\_time: 1.1999999999999993  
Word: 電, start\_time: 25.2, end\_time: 25.5, continued\_time: 0.30000000000000007  
Word: 會, start\_time: 25.5, end\_time: 25.6, continued\_time: 0.10000000000000142  
Word: 變, start\_time: 25.6, end\_time: 25.8, continued\_time: 0.19999999999999993  
Word: 得, start\_time: 25.8, end\_time: 25.9, continued\_time: 0.099999999999999787  
Word: 很, start\_time: 25.9, end\_time: 25.9, continued\_time: 0.0  
Word: 嚴, start\_time: 25.9, end\_time: 26.1, continued\_time: 0.20000000000000284  
Word: 重, start\_time: 26.1, end\_time: 26.3, continued\_time: 0.19999999999999993  
Word: 的, start\_time: 26.3, end\_time: 27.0, continued\_time: 0.69999999999999993  
Word: 二, start\_time: 27.1, end\_time: 27.1, continued\_time: 0.0  
Word: 個, start\_time: 27.1, end\_time: 27.2, continued\_time: 0.099999999999999787  
Word: 是, start\_time: 27.2, end\_time: 27.4, continued\_time: 0.19999999999999993  
Word: 他, start\_time: 27.4, end\_time: 27.6, continued\_time: 0.20000000000000284  
Word: 抗, start\_time: 27.6, end\_time: 28.6, continued\_time: 1.0  
Word: 這, start\_time: 28.6, end\_time: 28.8, continued\_time: 0.19999999999999993  
Word: 個, start\_time: 28.8, end\_time: 28.9, continued\_time: 0.099999999999999787  
Word: 工, start\_time: 28.9, end\_time: 29.2, continued\_time: 0.30000000000000007  
Word: 作, start\_time: 29.2, end\_time: 29.3, continued\_time: 0.10000000000000142  
Word: 便, start\_time: 29.3, end\_time: 29.6, continued\_time: 0.30000000000000007  
Word: 利, start\_time: 29.6, end\_time: 29.7, continued\_time: 0.099999999999999787  
Word: 的, start\_time: 29.7, end\_time: 29.9, continued\_time: 0.19999999999999993

```
print ("0.1972 * math.pow(x, -1.041) : ", 0.1972 * math.pow(0.19999999, -1.041))
```

公式： $y = 0.1972x^{-1.041}$

0.1972 \* math.pow(x, -1.041) : 1.0532578574884441



The image shows a Notepad window titled "test\_persen3.ssml - 記事本" with the following SSML code:

```
<speak>
<prosody rate = "1.053">
些中風腦麻病人的構音異常聲音的轉換，那這些這個會議場地產品這
樣的作文的以後它就會像一隻隨身筆隨身筆可想而知它是需要的，它
可以攜帶對這些病人，如果不構成負擔的話，它這個電子裝置
</prosody>
</speak>
```

Below the Notepad window is a terminal window showing the following output:

```
Word: 子, continue_time: 0.099999999999999964
Word: 裝, continue_time: 0.30000000000000007
Word: 置, continue_time: 0.099999999999999964
total time: 16.0 num count: 80
100% average time: 0.2
```

得證，此公式合理且準確  
(已完成) 30sec\_In\_addtag\_optimize\_syn.py