TUG 2013

On the Possibility of Automatic Balancing of Ideograhic Character Design

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Relation between Number of Lines and Line Width

TBGothic Bold

Blackness and Length of Strokes

- in UltraLight design, they are linear.
- in Heavy design, blackness saturates.
  - I did not consider the number of crossing point
- average of the blackness can be estimated by a quadratic function
  - blackness of each character varies
- I applied this result to Wadalab font
  - improved, but the result was poor

Facts about Wadalab Font (1)

- Developed in early 1990s by Dr. Tetsuro Tanaka and other members of Wada Laboratory of Univ. of Tokyo
- Written from scratch and genuinly their own intellectual property.
- At first, the software were not publicly available.
  - ◇ font data (Type 1, later CID-keyed) was available.

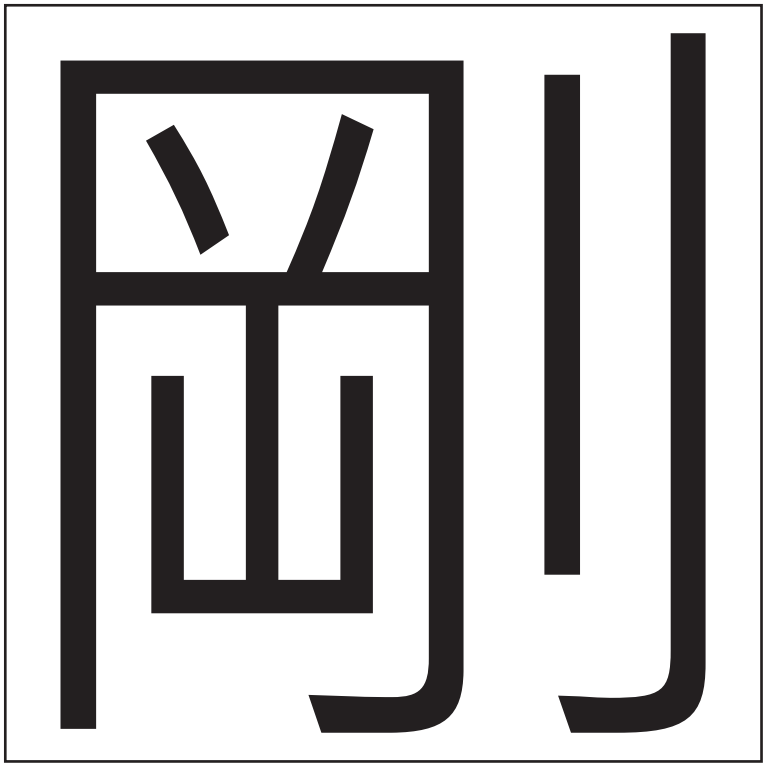
Facts about Wadalab Font (2)

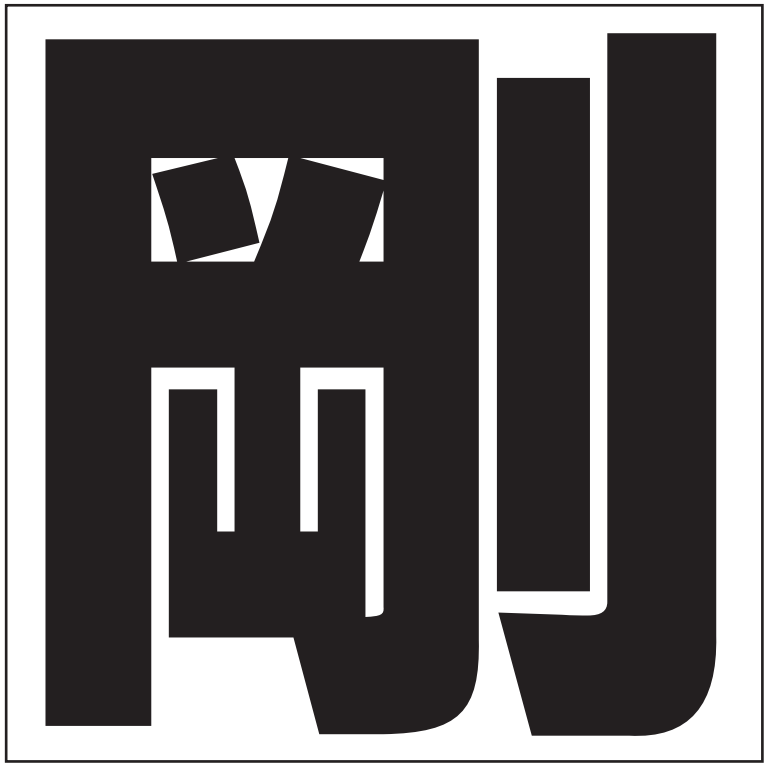
- in 2003, copyright infringement issues arose on another font.
- I asked Dr. Tanaka to make the software open-source.
  - ◇ that is (original) Wadalab FontKit
- originally written in UtiLisp, their original Lisp implementation.
  - ◇ Common Lisp port, CLWFK is available from sourceforge.jp

Principle of Stroke Width Variation within a Character

- Longer lines gets thicker.
- Surrownding lines are thicker.
  - ◇ leftmost and rightmost in the character
  - ◇ surrownding radicals
- If a line penetrates another parts, it gets thicker.
- If two lines make a pair, right one is slightly thicker than left one.

Example

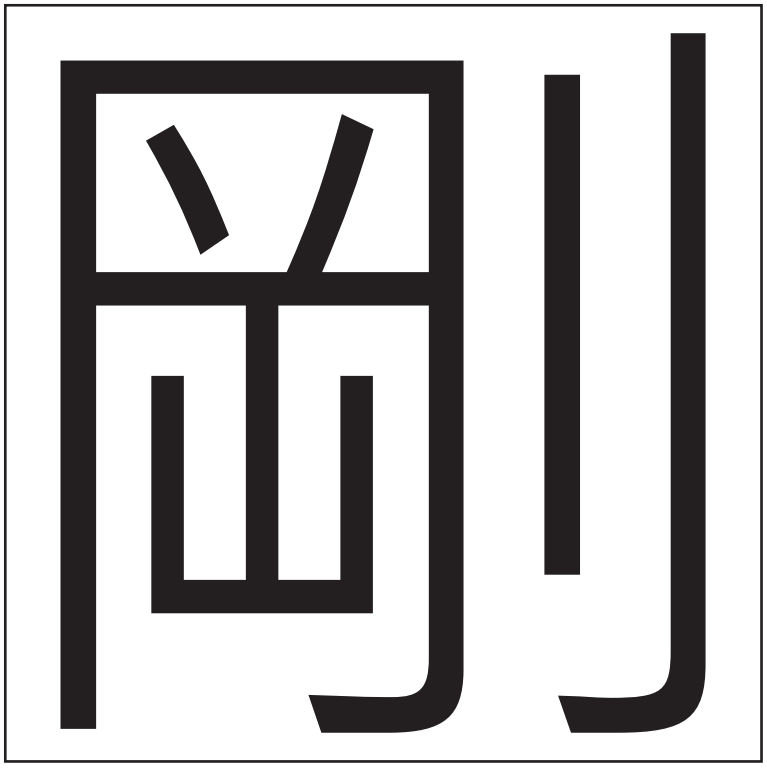


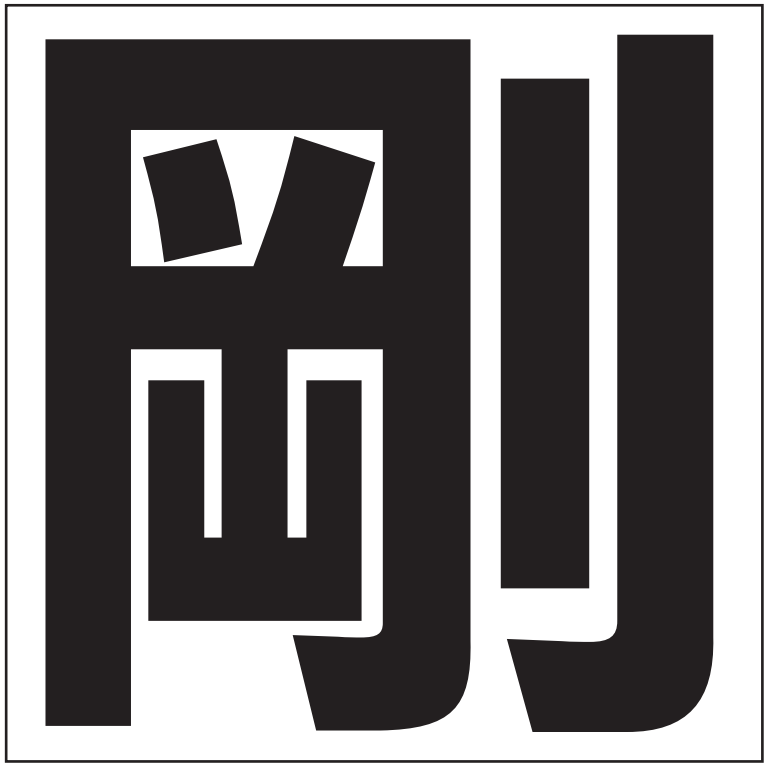


2 6 5 6 3 4 1

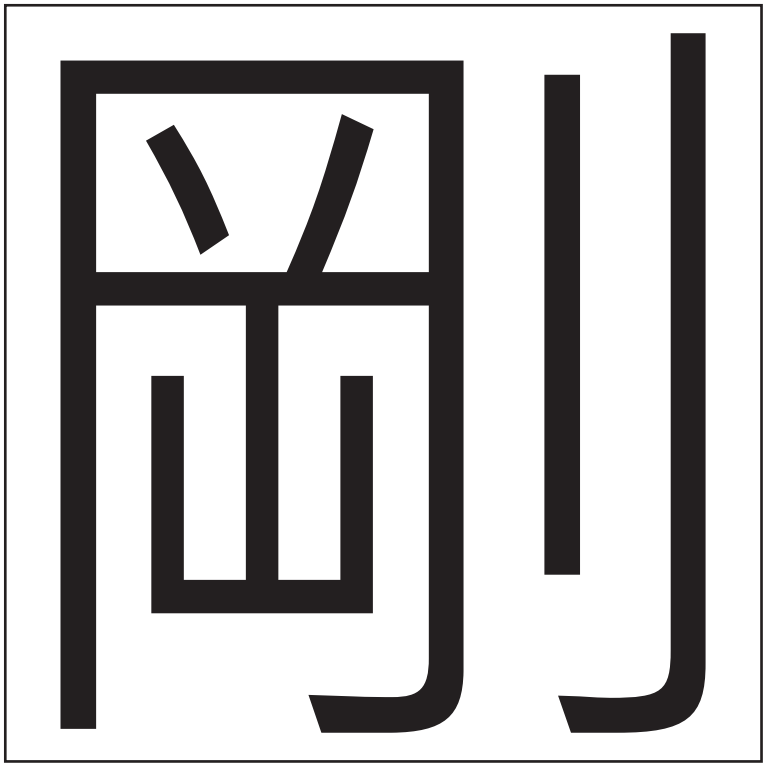
Width of Strokes Affects the Shape of Skeleton (Center Line) of the Character

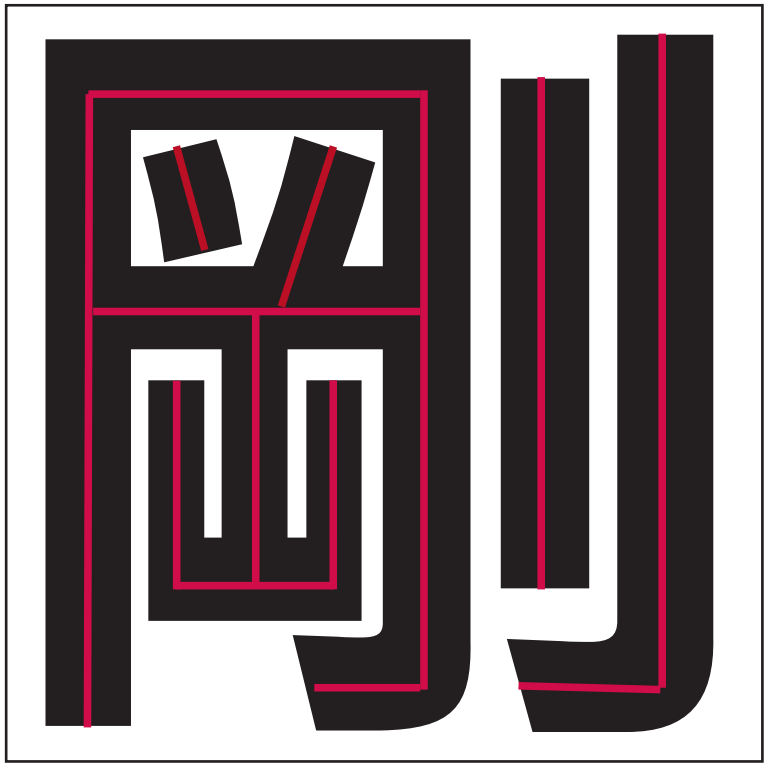
Example





Example





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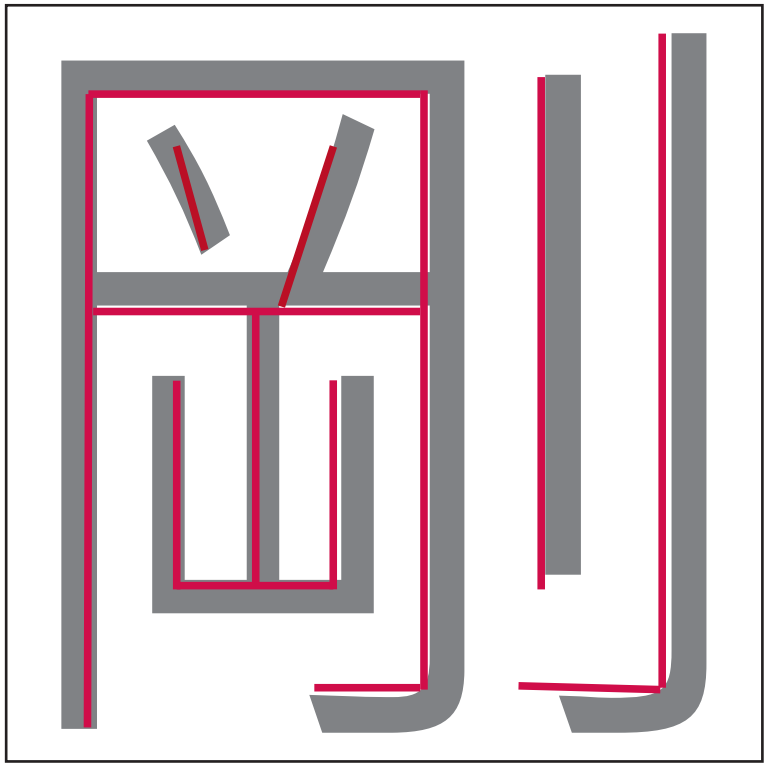

Automatic Balancing of Radicals

- Very hard
- Number of parameters are innumerable
  - ◇ stroke widths doesn't exceed the number of strokes
- Depends on designers preference
  - ◇ younger designers prefer higher "center of gravity"
  - ◇ Chinese designers prefer narrower counter space than Japanese designers
- Manual Instruction is impossible
  - ◇ machine learning (so-called "Bonanza Method") will be effectual