On the Possibility of Automatic Balancing of Ideographie Character Design

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Relation between Number of Lines and Line Width
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 genuinely 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.
• Surrounding lines are thicker.
  ◊ leftmost and rightmost in the character
  ◊ surrounding 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

剛 剛

2 6 5 6 3 4 1
Width of Strokes Affects the Shape of Skeleton (Center Line) of the Character
Example

剛

剛
Example
Example

剛

剛
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