To begin with...writing about the design spaces of font families, specifically those that are possible with variable fonts, is an exciting task. It's hoped that starting slowly, defining the combining of modules that form design spaces, describing design spaces in order of increasing complexity, and having fonts capable of demonstrating many different possibilities, will be helpful.
[fig.1, intro to Decovar, Amstelvar, Roboto Flex]

[first aside; typographic view calibration]
[second aside; script of the author-vworld script]

Type design spaces
While the design space of any font family can be described per style numerically, most users and type designers do not think or talk much like they are. Spaces are described as "a stand-alone display face", "Regular, italic and Bold", "Thin to Bold, and Extra-compressed to Wide, 54 styles in all + italic" e.g. and etc.
[figure 2] typical families
Programs and web programmers may refer to the metadata values of font families, like weights from 200 to 700, (on a scale from 100 to 1000), which allows name-to-number style identification, but the actual range of weights in different design spaces almost never contains 500/1000th of an em change, and weight of 200 isn't half the weight of the 400 of the same family, and no two font families with that metadata range are likely to have the same appearance of weight visually at the same size, much less over a range of sizes of use.

Even a single style of a typeface can vary visually over a size range, because that's inherent in the scaling of small complex graphics like glyphs. A light weight or small part loses impact visually as it scales down, while a heavy weight or big part gains impact visually over the same range.
[fig. 3a and b]. Scaling single masters down

And, because type is type and scales up as well, a light face at small sizes seems too heavy as it scales up, and a heavy face and small sizes seems too light scaled up.
[fig. 4a and b]. scaling single masters up.

Also because type is type, medium weight fonts that don't have much contrast between their parts are less susceptible to change in visual appearance as they scale, than are designs with contrasting strokes.
[figure 5]. Medium weight mono-linear safety.

Scaling and weigh change are both of course affected by the complexity of the glyphs in the font, with some glyphs having but a single stroke, while other glyphs may contain dozens. [figure 3]. "Biang biang" vs "I"

And these two effects, glyph complexity and the optical effects of scaling type up and down, explain the long presence for optical size masters in type, leading finally to its inclusion in the opentype font format

Without words or standardized reference numbers, the other way of describing design space in font families are actual measurements, numbers that represent the relationships between each measure and a common value, like 1/1000ths. So e.g., if a design space has a light weight where the H stem measures 50/1000ths of the em, and the extra bold H stem measures 450/1000ths, the design space of the weight axes can be summarized as having a weight range of 400/1000ths.
[fig. 6a and b]. Showing measures of "H" stem.

This can be very useful in shaping the view of a design space, as optical size masters typically change the measured ranges of weight and width they cover, and width can have a narrower range per/1000 of variation than weight. Thus, a design space file with optical size, weight and width axes can end up with a measured design space in the shape of an inverted rectangular pyramid. [figure 7a, b and c].

Shape of design space, glyph complexity and font measures aside... there's a great deal of design space variation to cover describing the range from a standalone display face to a three axes variable font.

A stand-alone display face, for purposes of this discussion will be typically one style, strongly expressive, so that via typographic composition its expressiveness becomes highly noticeable, and effective, to a reader's feeling for the content. This of course began as hand-drawing or painting letters. Going forward in type history to letterpress, the drawn and painted and decorated letters small enough to fit in a press became font styles at 1 or 2 sizes. From hot metal type to desktop, to web, single expressive display types have remained, and may still be made by hand though now they can be described in exactly the same format fonts for other uses.

Typefaces like these, up until photographic composition of type and then on to digital type, had a direct 1:1 relationship between the metal font and the point size, making it possible to define the details of the expression up to 1/10,000th of an inch, and ensuring font developers and users of fidelity between what founders saw, and what users got from using such faces. Leaving these behind for the most part, many types in use today fall into a broad category, once called "practical", where the typeface family has styles making it easy to compose, economical to use, approachable by some audience, or a group of audiences, legible and often readable to the audience over a range of sizes. [aside 4]

Weight Axes considerations
In variable design space, the most popular single-axis in practical typefaces is weight, so examining that variation in detail is a familiar way of examining issues related to design spaces. What variation goes on along the weight axis, first and foremost depends on the script, secondly on the class of typeface, and thirdly how much weight range it covers.

After that, the four general possibilities for varying weight in a typeface family include doing so without changing the width of the glyphs, or without changing the proportion of the width, or with change to both weight the width's proportions. And the fourth possibility is a script or style whose major stems, those that define the weight of a style, are vertically measured, such that adding weight has more effect on Vertical rather than horizontal proportions of a typeface.

Practical font families designed for Latin script don't include fonts with reverse stress so the kinds of weight changes considered here include monospaced and "graded" font styles, that change weight without changing width, families changing weight with proportional change to width, and changing weight and the proportions of width.
[fig. 8 a,b,c]

Lastly, in Latin classes of type, the addition and subtraction of weight does not consistently apply between mono-linear, and contrasting typeface families, e.g Roboto Flex vs Amstelvar. Fonts like Roboto Flex and slab serif designs, can only add weight to the horizontal stems until there is not enough room vertically to keep up with the weight added to horizontal stems. So as a sans adds weight, the type designer thins some stems of the otherwise mono-linear design. Serif designs like Times Roman and Amstelvar and many others can gain extraordinary weight without any change the contrast between the thin strokes and not run out of vertical space.
[fig. 9a and b]

Weight Axes plans
So planning a variation axis for weight requires consideration of the script, class, and quantity of change, and the kinds of change the design is to contain for a weight variation.
[fig.10]

Then, depending on the amount of change in weight of the design space, what additional masters are required for accurate representation of those changes. The most obvious need occurs over a large range of weigh, where lighter weights have horizontal and vertical strokes close to, or precisely the same, and while the regular weight may vary slightly from a 1:1 stem relationship, the bold does *not*, approaching a 2:1 ratio.

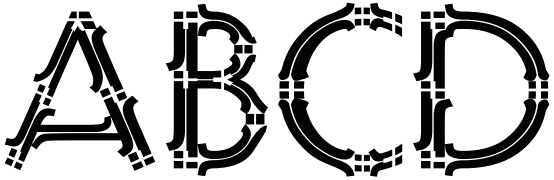
So if the weigh axis is going to go beyond a fairly limited range in a sans, there must be one or more intermediate styles along the weight axis to change the variation of the vertical stems relative to the horizontal weight, to maintain the visual appearance of mono-linearity. A design space with a weight axes that needs no intermediate, is basically the same as the old adobe multiple master technique, while variable font design space can be based on a "middle", and have as many intermediates as required by the script, class kind of weight or amount of change in the weight axis.

The other consideration of weights in a variable font family is how the range changes as it is added to the visual effects of other axes, optical size and width in particular.

Optical size axes considerations
Size-specific font families are how moveable type began, and developed for several hundred years before digital outline fonts. Unlike weight, optical size uses a traditional typographic value system, points, that are 72 to the inch, and so anchor the ideal use of the optical size axis in a known unit system. However, and though it reads like a group discussion in a whirlpool, there is more discussions about size and css, and opsz and OS here, github.com/w3c/csswg-drafts/issues/4430#issuecomment-640797734

Planning opsz

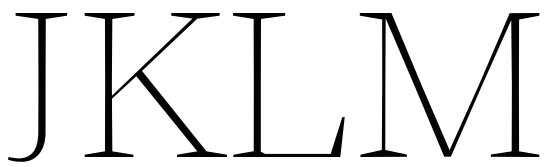
Fig.1



DECOVAR

Inline Skeleton 80 Open Inline Terminal 180 In-line terminal 110 Weight 88 Worm Skeleton 818 Bifurcated .18

opsz 72 wght 650 wdth 115



opsz 72 wght 125 wdth 112

Fig.2

DECOVAR 

ROBOTO Flex REGULAR *ITALIC* **BOLD**

Amstelvar

Fig. 3

Go **Go**

Going down **Going down**

Fig. 4

Go **Go**

Going up **Going up**

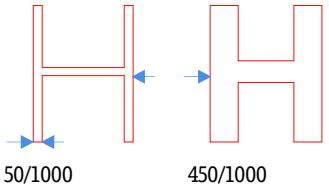
Fig. 5

Go Go

Going up Going Down

Fig. 6

Fig. 7



wght axis = 400

Fig. 8

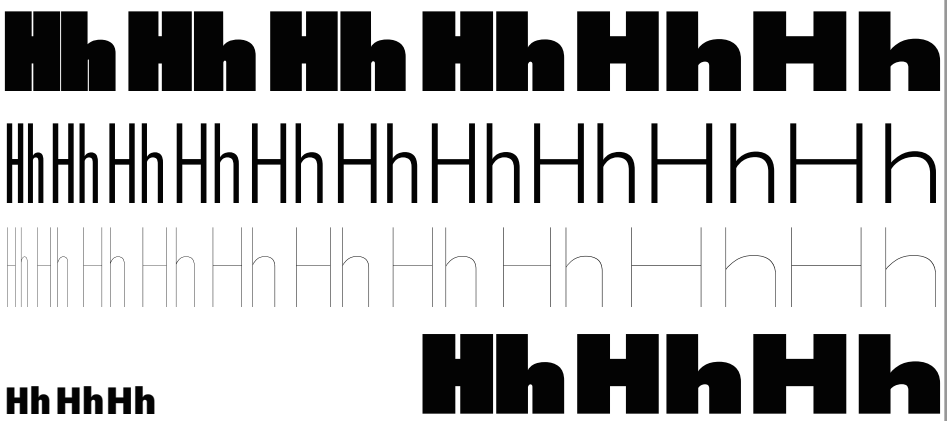


Fig. 9

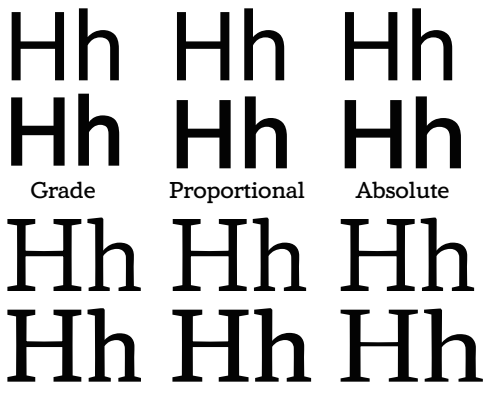


Fig. 10

Fig. 11


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Fig. 12


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Fig. 13


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Fig. 14


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Fig. 15, Scaling with optical sizes.

Fig. 16, Scaling without optical sizes.

Fig. 17, Scaling with optical sizes.

Fig. 18, Scaling without optical sizes from 14 pt master.

Fig. 19. Weight Axes

Weight MM

1 — wght — 2

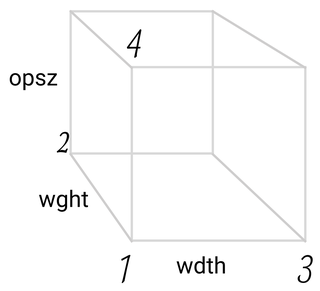
Weight VF

1 — wght — 2

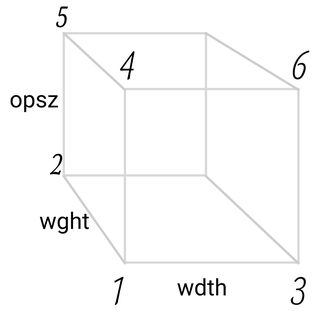
1 — 2 wght — 3

2a — 1 wght — 2b

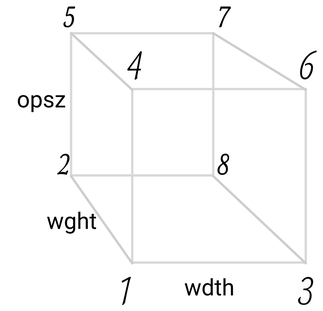
Winged MM



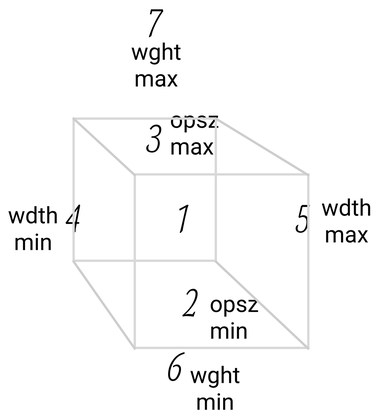
Hinged MM



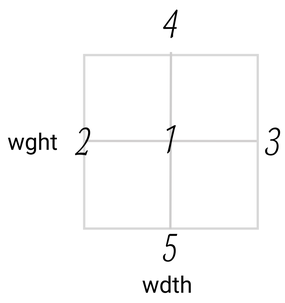
Boxed MM



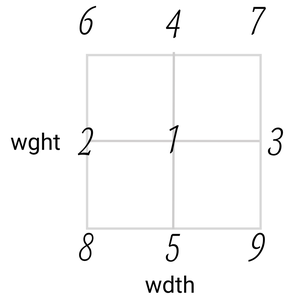
Winged Vf



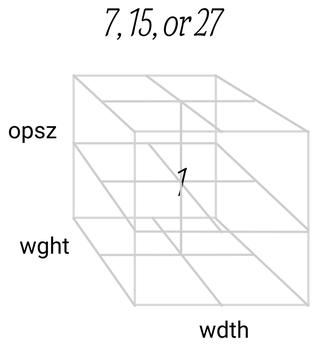
Diamond Vf (1 opsz, 2 axes)



Boxed Vf (1 opsz, 2 axes)



Boxed Vf (3 axes)



Cross-sections of cube