iwonamath—a scaled version of Iwona math fonts

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Abstract

LaTeX support for scaled Iwona math fonts for mixing with sans serif text fonts.

1 User manual

Iwona is a sans serif typeface by Janusz Marian Nowacki. It has a very good math support [Nowacki, 2005]. Package iwona integrates text and math fonts. However, the math fonts may provide interesting companions for other text fonts. To enable the combination, this package separates math fonts and provides tools for the package writers to mix and match them with text.

options/light
options/condensed
options/scale
options/Scale
options/delimitershack
options/standardversion

The package has the following options:

light whether the math fonts use the light version of Iwona, either `true` or `false` (default)

condensed whether the math fonts use the condensed version of Iwona, either `true` or `false` (default).

scale the scale of the fonts, a number (by default 1). The title cased `Scale` is the synonym for this key.

delimitershack whether to use the hack to get `\lVert` and `\rVert` delimiters, absent in the original font (see [Mittelbach and Fischer, 2023, § 12.5.5]), either `true` (default) or `false`.

standardversions whether to define standard versions `normal` and `bold`, either `true` (default) or `false`. If `false`, then the package does not define any math fonts, and it is up to the user to deploy `\DefineIwonaMathVersion` do define them.

\DefineIwonaMathVersion

`\DefineIwonaMathVersion{`⟨*key/value pairs*⟩`}`

The main function of the package, `\DefineIwonaMathVersion` defines a new math version based on Iwona fonts.

The keys are the following (the defaults, where applicable, correspond to the package options):

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main/name
main/light
main/condensed
main/bold

name the name of the version. By default, either `normal` or `bold` depending on the `bold` key described below.

light whether the math fonts use the light version of Iwona, either `true` or `false`

condensed whether the math fonts use the condensed version of Iwona, either `true` or `false`.

bold whether we define a bold version, either `true` or `false` (default)

For the boolean keys the setting `=true` can be omitted, so `\DefineIwonaMathVersion{light=true}` and `\DefineIwonaMathVersion{light}` are equivalent

Note that in the current implementation the parameters `scale` and `delimitershack` are the same for all versions defined.

For example, the following invocation defines four math versions, `normal`, `bold`, `condensed` and `boldcondensed`, based on Iwona light, scaled 1.2:

```
\usepackage[scale=1.2, light]{iwonamath}
\DefineIwonaMathVersion{name=condensed,
                        condensed=true}
\DefineIwonaMathVersion{name=boldcondensed,
                        bold=true, condensed=true}
```

2 Implementation

2.1 Setting up

First, we declare who we are:

```
⟨@@=iwonamath⟩
⟨package⟩\ProvidesExplPackage {iwonamath}
⟨fd⟩\ProvidesExplFile
⟨ot1m⟩{ot1_FAMILY_m.fd}
⟨ot1⟩{ot1_FAMILY_.fd}
⟨oml⟩{oml_FAMILY_.fd}
⟨oms⟩{oms_FAMILY_.fd}
⟨omx⟩{omx_FAMILY_.fd}
⟨cmsy⟩{omsiwonamathcmsy.fd}
⟨package | fd⟩{2024-07-19} {1.1}
⟨package | fd⟩{Scaled Iwona math fonts}
⟨*package⟩
```

2.2 Options

\l__iwonamath_scale_tl
\l__iwonamath_mainlight_bool
\l__iwonamath_maincondensed_bool
\l__iwonamath_delimitershack_bool
\l__iwonamath_standardversions_bool
options/light
options/condensed
options/scale
options/Scale
options/delimitershack
options/standardversion

```
\keys_define:nn { iwonamath/options }
{
  scale .tl_set:N = \l__iwonamath_scale_tl,
  Scale .tl_set:N = \l__iwonamath_scale_tl,
  light .bool_set:N = \l__iwonamath_mainlight_bool,
  light .default:n = true,
```

```
  condensed .bool_set:N = \l__iwonamath_maincondensed_bool,
  condensed .default:n = true,
  delimitershack .bool_set:N = \l__iwonamath_delimitershack_bool,
  delimitershack .default:n = true,
  standardversions .bool_set:N = \l__iwonamath_standardversions_bool,
  standardversions .default:n = true,
}

\keys_set:nn {iwonamath/options }
{
  scale = 1,
  light = false,
  condensed = false,
  delimitershack = true,
  standardversions = true,
}
```

(*End of definition for* `\l__iwonamath_scale_tl` *and others. These variables are documented on page 1.*)

Options processing

```
\IfFormatAtLeastTF { 2022-06-01 }
  { \ProcessKeyOptions [ iwonamath/options ] }
  {
    \RequirePackage { l3keys2e }
    \ProcessKeysOptions { iwonamath/options }
  }
```

`\l__iwonamath_versionname_tl`
`\l__iwonamath_light_bool`
`\l__iwonamath_condensed_bool`
`\l__iwonamath_bold_bool`
`main/name`
`main/light`
`main/condensed`
`main/bold`

Now the options for the main command

```
\keys_define:nn { iwonamath/main }
{
  name .tl_set:N = \l__iwonamath_versionname_tl,
  light .bool_set:N = \l__iwonamath_light_bool,
  light .default:n = true,
  condensed .bool_set:N = \l__iwonamath_condensed_bool,
  condensed .default:n = true,
  bold .bool_set:N = \l__iwonamath_bold_bool,
  bold .default:n = true,
}
```

(*End of definition for* `\l__iwonamath_versionname_tl` *and others. These variables are documented on page 2.*)

2.3 Delimiters hack

We add delimiters from `cmsy`, as discussed in [Mittelbach and Fischer, 2023, § 12.5.5]). We predefine the symbols for the standard versions just in case. The last line is suggested by Enrico Gregorio.

```
\bool_if:NTF \l__iwonamath_delimitershack_bool
{
  \DeclareSymbolFont{symbols2}{OMS}{iwonamathcmsy}{m}{n}
  \SetSymbolFont{symbols2}    {bold}{OMS}{cmsy}{b}{n}
  \DeclareMathDelimiter{\lVert}{\mathopen} {symbols2}{"6B}{largesymbols}{"0D}
  \DeclareMathDelimiter{\rVert}{\mathclose}{symbols2}{"6B}{largesymbols}{"0D}
  \DeclareMathDelimiter{\|}{\mathclose}{symbols2}{"6B}{largesymbols}{"0D}
}
{}
```

2.4 The main function

\DefineIwonaMathVersion

```
\DeclareDocumentCommand \DefineIwonaMathVersion { m }
{
  \tl_clear:N \l__iwonamath_versionname_tl
  \bool_set_eq:NN \l__iwonamath_light_bool \l__iwonamath_mainlight_bool
  \bool_set_eq:NN \l__iwonamath_condensed_bool \l__iwonamath_maincondensed_bool
  \bool_set_false:N \l__iwonamath_bold_bool
  \keys_set:nn { iwonamath/main }
  {
    #1
  }

  \tl_if_empty:NTF \l__iwonamath_versionname_tl
  {
    \bool_if:NTF \l__iwonamath_bold_bool
    {
      \tl_set:Nn \l__iwonamath_versionname_tl {bold}
    }
    {
      \tl_set:Nn \l__iwonamath_versionname_tl {normal}
    }
  }
  {}

  \tl_set:Nn \l_tmpa_tl {iwonamath}


  \bool_if:NTF \l__iwonamath_light_bool
  {
    \tl_set:Ne \l_tmpa_tl {\l_tmpa_tl l}
  }
  {}

  \bool_if:NTF \l__iwonamath_condensed_bool
  {
    \tl_set:Ne \l_tmpa_tl {\l_tmpa_tl c}
  }
  {}

  \DeclareMathVersion{\l__iwonamath_versionname_tl}
  \bool_if:NTF \l__iwonamath_bold_bool
  {
    \SetSymbolFont{operators}{\l__iwonamath_versionname_tl}{OT1}{\l_tmpa_tl m} {b}{n}
    \SetSymbolFont{letters}  {\l__iwonamath_versionname_tl}{OML}{\l_tmpa_tl} {b}{it}
    \SetSymbolFont{symbols}  {\l__iwonamath_versionname_tl}{OMS}{\l_tmpa_tl}{b}{n}
    \SetSymbolFont{largesymbols}{\l__iwonamath_versionname_tl}{OMX}{\l_tmpa_tl}{b}{n}
    \SetMathAlphabet\mathsf{\l__iwonamath_versionname_tl}{OT1}{\l_tmpa_tl}{bx}{n}
    \SetMathAlphabet\mathit{\l__iwonamath_versionname_tl}{OT1}{\l_tmpa_tl}{bx}{it}
    \SetSymbolFont{symbols2}    {\l__iwonamath_versionname_tl}{OMS}{iwonamathcmsy}{b}{n}
  }
  {
    \SetSymbolFont{operators}{\l__iwonamath_versionname_tl}{OT1}{\l_tmpa_tl m}{m}{n}
```

```
    \SetSymbolFont{letters}{\l__iwonamath_versionname_tl}{OML}{\l_tmpa_tl} {m}{it}
    \SetSymbolFont{symbols}{\l__iwonamath_versionname_tl}{OMS}{\l_tmpa_tl}{m}{n}
    \SetSymbolFont{largesymbols}{\l__iwonamath_versionname_tl}{OMX}{\l_tmpa_tl}{m}{n}
    \SetMathAlphabet{\mathbf}{\l__iwonamath_versionname_tl}{OT1}{\l_tmpa_tl}{bx}{n}
    \SetMathAlphabet{\mathsf}{\l__iwonamath_versionname_tl}{OT1}{\l_tmpa_tl}{m}{n}
    \SetMathAlphabet{\mathit}{\l__iwonamath_versionname_tl}{OT1}{\l_tmpa_tl}{m}{it}
    \SetMathAlphabet{\mathtt}{\l__iwonamath_versionname_tl}{OT1}{\l_tmpa_tl}{m}{n}
    \SetSymbolFont{symbols2}    {\l__iwonamath_versionname_tl}{OMS}{iwonamathcmsy}{m}{n}
  }

  \bool_if:NTF \l__iwonamath_delimitershack_bool
  {

  }
  {}

}
```

(*End of definition for* `\DefineIwonaMathVersion`. *This function is documented on page* 1.)

2.5 Default versions

If standard versions are requested, we define them

```
\bool_if:NTF \l__iwonamath_standardversions_bool
{
  \DefineIwonaMathVersion{}
  \DefineIwonaMathVersion{bold}
}
{}
```

⟨/package⟩

2.6 Font definition files

Now, the fd files. Sometimes they are defined in special `fdd` files; here we use the main `dtx` for this.

First, we check if the size is defined. If not, we define it.

```
⟨*fd⟩
\tl_if_exist:NTF \l__iwonamath_scale_tl
{}
{
  \tl_new:N \l__iwonamath_scale_tl
  \tl_set:Nn \l__iwonamath_scale_tl {1}
}
⟨/fd⟩
```

Our version of `cmsy` just scales the font. Note that right now the scaling is exactly the same as for other iwona math characters—maybe we need to fine tune this.

```
⟨*cmsy⟩
\DeclareFontFamily{OMS}{iwonamathcmsy}{\skewchar\font48 }
\DeclareFontShape{OMS}{iwonamathcmsy}{m}{n}{%
      <-> [\l__iwonamath_scale_tl] cmsy10%
      }{}
\DeclareFontShape{OMS}{iwonamathcmsy}{b}{n}{%
```

Table 1: Naming scheme for iwona fonts

Weight/Shape	Base			
	Regular	Condensed	Light	Light Condensed
m/n	iwonar	iwonacr	iwonal	iwonacl
m/it	iwonari	iwonacri	iwonali	iwonacli
b/n	iwonab	iwonacb	iwonam	iwonacm
b/it	iwonabi	iwonacb	iwonami	iwonacmi

```
      <-> [\l__iwonamath_scale_tl] cmbsy10%
      }{}
⟨/cmsy⟩
```

Now, we need many files in the different weights and condensed/regular status. It would be too tedious to write all them. So we create a template with the special marks and a bash script to generate all `fd` files. Of course, TEX with enough trickery can be used instead of bash, but why bother: we employ Makefiles anyways...

The naming scheme for Iwona fonts is shown in Table 1. From this table we see we need three marks: `_FAMILY_` for the base family, `_MEDIUM_` for medium font and `_BOLD_` for bold font.

We have two `OT1` files: one for default letters, one for `\math...` commands.

```
⟨*ot1m⟩
\DeclareFontFamily{OT1}{_FAMILY_m}{}
\DeclareFontShape{OT1}{_FAMILY_m}{m}{n}{<-> [\l__iwonamath_scale_tl] rm-_MEDIUM_}{}
\DeclareFontShape{OT1}{_FAMILY_m}{b}{n}{<-> [\l__iwonamath_scale_tl] rm-_BOLD_}{}
⟨/ot1m⟩
⟨*ot1⟩
\DeclareFontFamily{OT1}{_FAMILY_}{}
\DeclareFontShape{OT1}{_FAMILY_}{m}{n}{<-> [\l__iwonamath_scale_tl] rm-_MEDIUM_}{}
\DeclareFontShape{OT1}{_FAMILY_}{m}{it}{<-> [\l__iwonamath_scale_tl] rm-_MEDIUM_i}{}
\DeclareFontShape{OT1}{_FAMILY_}{b}{n}{<-> [\l__iwonamath_scale_tl] rm-_BOLD_}{}
\DeclareFontShape{OT1}{_FAMILY_}{bx}{n}{<-> [\l__iwonamath_scale_tl] rm-_BOLD_}{}
⟨/ot1⟩
⟨*oml⟩
\DeclareFontFamily{OML}{_FAMILY_}{}
\DeclareFontShape{OML}{_FAMILY_}{m}{it}{<-> [\l__iwonamath_scale_tl] mi-_MEDIUM_i}{}
\DeclareFontShape{OML}{_FAMILY_}{b}{it}{<-> [\l__iwonamath_scale_tl] mi-_BOLD_i}{}
\DeclareFontShape{OML}{_FAMILY_}{bx}{it}{<-> [\l__iwonamath_scale_tl] mi-_BOLD_i}{}
⟨/oml⟩
⟨*oms⟩
\DeclareFontFamily{OMS}{_FAMILY_}{}
\DeclareFontShape{OMS}{_FAMILY_}{m}{n}{<-> [\l__iwonamath_scale_tl] sy-_MEDIUM_z}{}
\DeclareFontShape{OMS}{_FAMILY_}{b}{n}{<-> [\l__iwonamath_scale_tl] sy-_BOLD_z}{}
\DeclareFontShape{OMS}{_FAMILY_}{bx}{n}{<-> [\l__iwonamath_scale_tl] sy-_BOLD_z}{}
⟨/oms⟩
⟨*omx⟩
\DeclareFontFamily{OMX}{_FAMILY_}{}
\DeclareFontShape{OMX}{_FAMILY_}{m}{n}{<-> [\l__iwonamath_scale_tl] ex-_MEDIUM_}{}
\DeclareFontShape{OMX}{_FAMILY_}{b}{n}{<-> [\l__iwonamath_scale_tl] ex-_BOLD_}{}
\DeclareFontShape{OMX}{_FAMILY_}{bx}{n}{<-> [\l__iwonamath_scale_tl] ex-_BOLD_}{}
```

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References

Frank Mittelbach and Ulrike Fischer. *The LaTeX Companion: Parts I & II, 3rd Edition*. Addison-Wesley Professional, May 2023. ISBN 978-01-3816-648-9.

Janusz Marian Nowacki. *The iwona package*, 2005. URL https://ctan.org/pkg/iwona.

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The italic numbers denote the pages where the corresponding entry is described, numbers underlined point to the definition, all others indicate the places where it is used.