

# The impnattyto package

Raphaël Pinson  
raphink@gmail.com

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## 1 Introduction

When it comes to French typography, the *Lexique des règles typographiques en usage de l'Imprimerie Nationale* is a definite reference.

While the majority of the recommendations of this book has been implemented in the frenchb module for babel, other recommendations still deserve to be automatized in order to be implemented in L<sup>A</sup>T<sub>E</sub>X.

Such is the original goal of this package, initiated by a question on the tex.stackexchange.com<sup>1</sup> website, and which implements several of the rules listed in this booklet so as to make them more easily applicable to texts edited with L<sup>A</sup>T<sub>E</sub>X.

As this package grew, functionalities were added, including some that were not directly related to the booklet, but improved the typographic quality of documents.

## 2 Usage

In order to use the impnattyto package, use the following line:

```
\usepackage[<options>]{impnattyto}
```

The package options are described in the following sections.

### 2.1 Hyphenation

`hyphenation` Besides the general hyphenation rules, the booklet indicates that we should ``prevent hyphenation of words on more than two consecutive lines."''

In order to simplify the code, the suggested implementation strongly discourages hyphenation at the end of pages, as well as hyphenation on two consecutive lines.

To active this functionality, use the `hyphenation` option:

```
\usepackage[hyphenation]{impnattyto}
```

---

<sup>1</sup><http://tex.stackexchange.com/questions/20493/french-typography-recommendations>

## 2.2 Paragraph formatting

`parindent` The booklet advises to indent paragraphs by 1em. This `\parindent` setting can be achieved by using the `parindent` option:

```
\usepackage[parindent]{impnatty}
```

`lastparline` Moreover, it is indicated in the "Hyphenation" section that "the last line of a paragraph must contain a word or the end of a word of a width at least equal to the double of the indent of the next paragraph." Since implementing this solution exactly is quite tricky, the `lastparline` option ensures that the last line of a paragraph is at least as long as the double value of `\parindent`.<sup>2</sup>

When Lua $\TeX$  is used, the solution provided by Patrick Gundlach<sup>3</sup> is used. With other rendering engines, it is the native solution provided by Enrico Gregorio<sup>4</sup> that serves as an implementation:

```
\usepackage[lastparline]{impnatty}
```

When the `draft` option is activated and Lua $\TeX$  is used, the inserted ties are colored in teal. The color can be tuned with the `lastparlinecolor` option.

`nosingletter` It is also recommended to avoid hyphenation points that would isolate a single letter. The solution proposed by Patrick Gundlach<sup>5</sup> allows to fix this by using Lua $\TeX$ . To activate this functionality, you can use the `nosingletter` option:

```
\usepackage[nosingletter]{impnatty}
```

When this option is activated, only Lua $\TeX$  (with the `lualatex` command) can render the document.

When the `draft` option is activated, the inserted ties are colored in brown. The color can be tuned by setting the `nosinglettercolor` option.

`homeoarchy` When two consecutive lines begin (`homeoarchy`) or end (`homoioteleuton`) with the same word or series of letters, it can confuse the reader, so this has to be avoided.

Fixing this problem automatically is very complex and generally not a good idea.<sup>6</sup> For this reason, the `homeoarchy` option in this package only detects and highlights them. Fixing them will usually be a matter of introducing ties in the paragraph:

```
\usepackage[homeoarchy]{impnatty}
```

When this option is activated, only Lua $\TeX$  (with the `lualatex` command) can render the document.

This option is only effective if the `draft` option is activated.

The inserted ties are colored with two colors:

---

<sup>2</sup><http://tex.stackexchange.com/questions/28357/ensure-minimal-length-of-last-line>

<sup>3</sup><http://tex.stackexchange.com/questions/28357/ensure-minimal-length-of-last-line/28361#28361>

<sup>4</sup><http://tex.stackexchange.com/questions/28357/ensure-minimal-length-of-last-line/28358#28358>

<sup>5</sup><http://tex.stackexchange.com/questions/27780/one-letter-word-at-the-end-of-line>

<sup>6</sup><http://tex.stackexchange.com/questions/27588/repetition-of-a-word-on-two-lines>

- Entire words are colored in **red** and this color can be set with the `homearchywordcolor` option;
- Partial words are colored in **orange** and this color can be set by means of the `homearchycharcolor` option;

A glyph sequence is considered problematic when:

- The number of entire matching words is greater than 1. This parameter can be tuned with the `homearchymaxwords` option;
- The number of matching characters is greater than 3. This parameter can be tuned with the `homearchymaxchars` option;

`rivers` A river is a vertical alignment of spaces in a paragraph. The `rivers` option allows to color rivers so as to identify them. This option does not fix the detected rivers:

```
\usepackage[rivers]{imnatty}
```

When this option is activated, only LuaTeX (with the `lualatex` command) can render the document.

This option is only effective if the `draft` option is activated.

The inserted ties are colored in **lime**. This color can be tuned by means of the `riverscolor` option.

## 2.3 Chapter numbering

`frenchchapters` When it comes to chapter numbering, the booklet indicates: "In a title, chapter numbers are typeset in roman capital numbers, except for the ordinal 'premier' written in letters in spite of the current fashion to write it in the cardinal form 'Chapter I.'"

The `frenchchapters` option of the package implements this recommendation:

```
\usepackage[frenchchapters]{imnatty}
```

Should you wish to use the ordinal form 'premier' without using roman numbers for chapter numbering, you can redefine the `frenchchapter` macro, for example:

```
\let\frenchchapter\arabic % use arabic numbers
\let\frenchchapter\babylonian % use babylonian numbers
```

## 2.4 Widows and Orphans

It is recommended not to leave widows and orphans in a document. For this reason, we recommend you use the `nowidow` package:

```
\usepackage[all]{nowidow}
```

See the package documentation for more options.

## 2.5 Draft mode

The `impnatty` package features a draft mode allowing to visualize the penalties (ties) inserted by the `nosingleletter` and `lastparline` options, as well as the information added by the `homeoarchy` and `rivers` options. In draft mode, places where ties were inserted are indicated by colored squares.

To activate the draft mode, use the `draft` option, for example:

```
\usepackage[draft,lastparline]{impnatty}
```

This document is generated with the `draft` option on in order to demonstrate its effects.

## 3 Implementation

```
1 \ProvidesPackage{impnatty}
2 \RequirePackage{ifluatex}
3 \RequirePackage{kvoptions}
4 \SetupKeyvalOptions{
5   family=impnatty,
6   prefix=int,
7 }
8 \DeclareBoolOption{draft}
9 \DeclareBoolOption{frenchchapters}
10 \DeclareBoolOption{hyphenation}
11 \DeclareBoolOption{nosingleletter}
12 \DeclareBoolOption{parindent}
13 \DeclareBoolOption{lastparline}
14 \DeclareBoolOption{homeoarchy}
15 \DeclareBoolOption{rivers}
16 \DeclareStringOption[red]{homeoarchywordcolor}
17 \DeclareStringOption[orange]{homeoarchycharcolor}
18 \DeclareStringOption[brown]{nosinglelettercolor}
19 \DeclareStringOption[teal]{lastparlinecolor}
20 \DeclareStringOption[lime]{riverscolor}
21 \DeclareStringOption[1]{homeoarchymaxwords}
22 \DeclareStringOption[3]{homeoarchymaxchars}
23 \ProcessKeyvalOptions*
24 \RequirePackage{xcolor}
25 \def\usecolor#1{\csname\string\color@#1\endcsname\space}
26 \ifinthyphenation
27   \brokenpenalty=10000
28   \doublehyphendemerits=100000000
29 \fi
30 \ifintfrenchchapters
31   \let\frenchchapter\Roman
32   \renewcommand{\thechapter}{%
```

No page finishes with an hyphenated word

Discourage hyphenation on two lines in a row

Number chapters

No single letter

Paragraph indentation

Last line of paragraph

```
33     \ifnum\value{chapter}=1
34         premier%
35     \else
36         \frenchchapter{chapter}%
37     \fi
38 }
39 \fi

40 \ifintnosingleletter
41     \ifluatex
42         \RequirePackage{luatexbase,luacode}
43         \begin{luacode}
44
45         local prevent_single_letter = function (head)
46             while head do
47                 if head.id == 37 then -- glyph
48                     if unicode.utf8.match(unicode.utf8.char(head.char),"%a") then -- some kind of let
49                         if head.prev.id == 10 and head.next.id == 10 then -- only if we are a
50
51                             local p = node.new("penalty")
52                             p.penalty = 10000
53
54                             \ifintdraft
55                                 local w = node.new("whatsit","pdf_literal")
56                                 w.data = "q \usecolor{\intnosinglelettercolor} 0 0 m 0 5 1 2 5 1 2 0 1 b Q"
57
58                                 node.insert_after(head,head,w)
59                                 node.insert_after(head,w,p)
60                             \else
61                                 node.insert_after(head,head,p)
62                             \fi
63                         end
64                     end
65                 end
66                 head = head.next
67             end
68             return true
69         end
70
71         luatexbase.add_to_callback("pre_linebreak_filter",prevent_single_letter,"~")
72     \end{luacode}
73 \else
74     \PackageError{The nosingleletter option only works with LuaTeX}
75 \fi
76 \fi

77 \ifintparindent
78 \setlength{\parindent}{1em}
79 \fi

80 \ifintlastparline
81     \ifluatex
```

```

82 \RequirePackage{luatexbase,luacode}
83 \begin{luacode}
84 last_line_twice_parindent = function (head)
85   while head do
86     local _w,_h,_d = node.dimensions(head)
87     if head.id == 10 and head.subtype ~= 15 and (_w < 2 * tex.parindent) then
88
89       -- we are at a glue and have less then 2*\parindent to go
90       local p = node.new("penalty")
91       p.penalty = 10000
92
93       \ifintdraft
94         local w = node.new("whatsit","pdf_literal")
95         w.data = "q \usecolor{\intlastparlinecolor} 0 0 m 0 5 1 2 5 1 2 0 1 b Q"
96
97         node.insert_after(head,head.prev,w)
98         node.insert_after(head,w,p)
99       \else
100        node.insert_after(head,head.prev,p)
101      \fi
102    end
103
104    head = head.next
105  end
106  return true
107 end
108
109 luatexbase.add_to_callback("pre_linebreak_filter",last_line_twice_parindent,"lastparline"
110 \end{luacode}
111 \else
112 \setlength{\parfillskip}{0pt plus\dimexpr\textwidth-2\parindent}
113 \fi
114 \fi
115 \ifinhomeoarchy
116 \ifintdraft
117 \ifluatex
118 \RequirePackage{luatexbase,luacode}
119 \begin{luacode}
120 compare_lines = function (line1,line2)
121   local head1 = line1.head
122   local head2 = line2.head
123
124   local char_count = 0
125   local word_count = 0
126
127   while head1 and head2 do
128     if (head1.id == 37 and head2.id == 37
129       and head1.char == head2.char) -- identical glyph
130     or (head1.id == 10 and head2.id == 10) then -- glue

```

Detect homeoarchies

```

131
132     if head1.id == 37 then -- glyph
133         char_count = char_count + 1
134     elseif char_count > 0 and head1.id == 10 then -- glue
135         word_count = word_count + 1
136     end
137     head1 = head1.next
138     head2 = head2.next
139     elseif (head1.id == 0 or head2.id == 0) then -- end of line
140         break
141     elseif (head1.id ~= 37 and head1.id ~= 10) then -- some other kind of node
142         head1 = head1.next
143     elseif (head2.id ~= 37 and head2.id ~= 10) then -- some other kind of node
144         head2 = head2.next
145     else -- no match, no special node
146         break
147     end
148 end
149 -- analyze last non-matching node, check for punctuation
150 if ((head1 and head1.id == 37 and head1.char > 49)
151     or (head2 and head2.id == 37 and head2.char > 49)) then
152     -- not a word
153 elseif char_count > 0 then
154     word_count = word_count + 1
155 end
156 return char_count,word_count,head1,head2
157 end
158
159 compare_lines_reverse = function (line1,line2)
160     local head1 = node.tail(line1.head)
161     local head2 = node.tail(line2.head)
162
163     local char_count = 0
164     local word_count = 0
165
166     while head1 and head2 do
167         if (head1.id == 37 and head2.id == 37
168             and head1.char == head2.char)           -- identical glyph
169         or (head1.id == 10 and head2.id == 10) then -- glue
170
171             if head1.id == 37 then -- glyph
172                 char_count = char_count + 1
173             elseif char_count > 0 and head1.id == 10 then -- glue
174                 word_count = word_count + 1
175             end
176             head1 = head1.prev
177             head2 = head2.prev
178         elseif (head1.id == 0 or head2.id == 0) then -- start of line
179             break
180         elseif (head1.id ~= 37 and head1.id ~= 10) then -- some other kind of node

```

```

181         head1 = head1.prev
182     elseif (head2.id ~= 37 and head2.id ~= 10) then -- some other kind of node
183         head2 = head2.prev
184     elseif (head1.id == 37 and head1.char < 48) then -- punctuation
185         head1 = head1.prev
186     elseif (head2.id == 37 and head2.char < 48) then -- punctuation
187         head2 = head2.prev
188     else -- no match, no special node
189         break
190     end
191 end
192 -- analyze last non-matching node, check for punctuation
193 if ((head1 and head1.id == 37 and head1.char > 49)
194     or (head2 and head2.id == 37 and head2.char > 49)) then
195     -- not a word
196 elseif char_count > 0 then
197     word_count = word_count + 1
198 end
199 return char_count,word_count,head1,head2
200 end
201
202 highlight = function (line,nend,color)
203     local n = node.new("whatsit","pdf_literal")
204
205     -- get dimensions
206     local w,h,d = node.dimensions(line.head,nend)
207     local w_pts = w/65536 -- scaled points to points
208
209     -- set data
210     n.data = "q " .. color .. " 0 0 m 0 5 1 " .. w_pts .. " 5 1 " .. w_pts .. " 0 1 b Q"
211
212     -- insert node
213     n.next = line.head
214     line.head = n
215     node.slide(line.head)
216 end
217
218 highlight_reverse = function (nstart,line,color)
219     local n = node.new("whatsit","pdf_literal")
220
221
222     -- get dimensions
223     local w,h,d = node.dimensions(nstart,node.tail(line.head))
224     local w_pts = w/65536 -- scaled points to points
225
226     -- set data
227     n.data = "q " .. color .. " 0 0 m 0 5 1 " .. w_pts .. " 5 1 " .. w_pts .. " 0 1 b Q"
228
229     -- insert node
230     node.insert_after(line.head,nstart,n)

```

```

231     end
232
233     homeoarchy = function (head)
234         local cur_line = head
235         local prev_line -- initiate prev_line
236
237         local max_char = tonumber(\inhomeoarchymaxchars)
238         local max_word = tonumber(\inhomeoarchymaxwords)
239
240         while head do
241             if head.id == 0 then -- new line
242                 prev_line = cur_line
243                 cur_line = head
244                 if prev_line.id == 0 then
245                     -- homeoarchy
246                     char_count,word_count,prev_head,cur_head = compare_lines(prev_line,cur_line)
247                     if char_count >= max_char or word_count >= max_word then
248                         local color
249                         if word_count >= max_word then
250                             color = "q \usecolor{\inhomeoarchywordcolor}"
251                         else
252                             color = "q \usecolor{\inhomeoarchycharcolor}"
253                         end
254
255                         -- highlight both lines
256                         highlight(prev_line,prev_head,color)
257                         highlight(cur_line,cur_head,color)
258                     end
259                 end
260             end
261             head = head.next
262         end
263         return true
264     end
265
266     luatexbase.add_to_callback("post_linebreak_filter",homeoarchy,"homeoarchy")
267
268     homoioteleuton = function (head)
269         local cur_line = head
270         local prev_line -- initiate prev_line
271
272         local max_char = tonumber(\inhomeoarchymaxchars)
273         local max_word = tonumber(\inhomeoarchymaxwords)
274
275         local linecounter = 0
276
277         while head do
278             if head.id == 0 then -- new line
279                 linecounter = linecounter + 1
280                 if linecounter > 1 then

```

```

281         prev_line = cur_line
282         cur_line = head
283         if prev_line.id == 0 then
284             -- homoioteleuton
285             char_count,word_count,prev_head,cur_head = compare_lines_reverse(prev_line,cur_line)
286             if char_count >= max_char or word_count >= max_word then
287                 local color
288                 if word_count >= max_word then
289                     color = "q \usecolor{\inhomeoarchywordcolor}"
290                 else
291                     color = "q \usecolor{\inhomeoarchycharcolor}"
292                 end
293
294                 -- highlight both lines
295                 highlight_reverse(prev_head,prev_line,color)
296                 highlight_reverse(cur_head,cur_line,color)
297             end
298         end
299     end
300 end
301 head = head.next
302 end
303
304     return true
305 end
306
307     luatexbase.add_to_callback("post_linebreak_filter",homoioteleuton,"homoioteleuton")
308     \end{luacode}
309 \else
310     \PackageError{The homeoarchy option only works with LuaTeX}
311 \fi
312 \fi
313 \fi
314 \ifintrivers
315 \ifintdraft
316 \ifluatex
317     \RequirePackage{luatexbase,luacode}
318     \begin{luacode}
319 river_analyze_line = function(line,dim1,dim2,precision)
320     local head = line.head
321
322     while head do
323         if head.id == 10 then -- glue node
324             local w1,h1,d1 = node.dimensions(line.glue_set,line.glue_sign,line.glue_order,line.head)
325             local w2,h2,d2 = node.dimensions(line.glue_set,line.glue_sign,line.glue_order,line.head)
326             --print("dim1: "..dim1..""; dim2: "..dim2..""; w1: "..w1..""; w2: "..w2")
327             if w1 > dim2 + precision then -- out of range
328                 return false,head
329             elseif w1 < (dim2 + precision) and w2 > (dim1 - precision) then -- found

```

Detect rivers

```

330         return true,head
331     end
332 end
333     head = head.next
334 end
335
336 return false,head
337 end
338
339 rivers = function (head)
340     local prev_prev_line
341     local prev_line
342     local cur_line = head
343     local cur_node
344     local char_count
345
346     local linecounter = 0
347
348     while head do
349         if head.id == 0 then -- new line
350             linecounter = linecounter + 1
351             prev_prev_line = prev_line
352             prev_line = cur_line
353             cur_line = head
354             if linecounter > 2 then
355                 cur_node = cur_line.head
356                 char_count = 0
357
358                 while cur_node do
359                     if cur_node.id == 37 then -- glyph
360                         char_count = char_count + 1
361                     elseif cur_node.id == 10 and char_count > 0 and cur_node.next then -- glue node
362                         -- prev_line
363                         local w1,h1,d1 = node.dimensions(head.glue_set,head.glue_sign,head.glue_order)
364                         local w2,h2,d2 = node.dimensions(head.glue_set,head.glue_sign,head.glue_order)
365                         -- if we allow up to 45° diagonal rivers, then there can be up to + or - line
366                         local w_p,h_p,d_p = node.dimensions(prev_line.head,cur_line.head) -- calculat
367                         found_p,head_p = river_analyze_line(prev_line,w1,w2,h_p)
368
369                     if found_p then
370                         -- prev_prev_line
371                         local w1,h1,d1 = node.dimensions(prev_line.glue_set,prev_line.glue_sign,pr
372                         local w2,h2,d2 = node.dimensions(prev_line.glue_set,prev_line.glue_sign,pr
373                         -- if we allow up to 45° diagonal rivers, then there can be up to + or - 1
374                         local w_p,h_p,d_p = node.dimensions(prev_prev_line.head,prev_line.head) --
375                         found_pp,head_pp = river_analyze_line(prev_prev_line,w1,w2,h_p)
376
377                     if found_pp then
378                         local n_pp = node.new("whatsit","pdf_literal")
379                         n_pp.data = "q \usecolor{\intriverscolor} 0 0 m 0 5 1 5 5 1 5 0 1 b Q"

```

```

380         node.insert_after(prev_prev_line,head_pp.prev,n_pp)
381
382         local n_p = node.new("whatsit","pdf_literal")
383         n_p.data = "q \usecolor{\intriverscolor} 0 0 m 0 5 1 5 5 1 5 0 1 b Q"
384         node.insert_after(prev_line,head_p.prev,n_p)
385
386         local n_c = node.new("whatsit","pdf_literal")
387         n_c.data = "q \usecolor{\intriverscolor} 0 0 m 0 5 1 5 5 1 5 0 1 b Q"
388         node.insert_after(cur_line,cur_node.prev,n_c)
389     end
390 end
391     end
392     cur_node = cur_node.next
393 end
394 end
395 end
396 head = head.next
397 end
398
399 return true
400
401 end
402
403
404 luatexbase.add_to_callback("post_linebreak_filter",rivers,"rivers")
405     \end{luacode}
406 \else
407     \PackageError{The homearchy option only works with LuaTeX}
408 \fi
409 \fi
410 \fi

```

## Change History

0.1	General: First version	1	0.7	General: Add homoioteleuton detection	1
0.2	General: Add nosingleletter option	1	0.8	General: Add river detection	1
0.3	General: Add parindent and lastparline options	1	0.9	General: River detection returns false by default	1
0.4	General: Add draft mode	1	1.0	General: Improve documentation, simplify internal variables	1
0.5	General: Add homearchy detection	1	1.1	General: Fix French documentation	1
0.6	General: Words contain at least one character	1			

- 1.2 1.4
- General: Fix French documentation . . . 1 General: Fix release date . . . . . 1
- 1.3
- General: Fix French documentation . . . 1

## Index

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