


# Informatics for Musicology (IPM) 2024/25

## Jupyter Notebooks

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### Class from 3-Dec : TP class on IPM libraries in Haskell

**Summary** : Musical analysis by *horizontalization* of chords: the function `horiz` . Case study: Prelude nr. 4 of opus 28 by [Fryderyk Chopin](#) (1810-1849). Completion of exploration of IPM (Haskell) libraries for 'Computer-Aided Musicology'.

Exercises to review the given material.

**! Important** : run without moving the next cells.

In [ ]:

```
: opt no - lint
: m Data . Char
: m Date . List
: m Date . List . Split
: m Data . Ratio
```

Modules developed for the discipline:



**12.1** - Start listening to the work by (a) copying the ABC code it generated onto the *clipboard* abcShow , given below; (b) enter the [online ABC editor](#) , paste and tap.

```

%%scale 0.7
%%pagewidth 20cm
%%barnumbers 10
X:1
%-- Abc file generated by Haskell library Abc.hs (IPM 2024/25)
M:C|
L:1/1
K:G
%%staves {1 2}
V:1
V:2
%-- the parts now
[V:1] B,3/16B1/16|B3/4c1/4|B3/4c1/4|B3/4c1/4|B3/4_B1/4|A3/4=B1/4|A3/4B1/4|A3/4B3/16A1/16|
A3/4^G1/4-|^G1/4A1/8B1/8 d1/8c1/8E1/8A1/8| F3/4A1/4|F3/4A1/4| =G1/8F1/8C1/8B,1/8
^D1/8F1/8(3=d1/8c1/8B1/8| B3/4c1/4|B3/4c1/4|B3/4c1/4|B3/16^A1/16A1/4g1/4f3/16e1/16|
e1/8^d1/8c'1/8d1/8 d1/8e1/8g1/8B1/8| =d1/8c1/8(3e1/8E1/8A1/8F3/8A1/8| F3/4A1/4|
F3/4F3/16E1/16| E3/4F1/4| E3/4F1/4| E1/2z1/2| E1/2^D1/2| E1/1|
[V:2] z1/4| [EB,G,]1/8[EB,G,]1/8[EB,G,]1/8[EB,G,]1/8
[EB,G,]1/8[EB,G,]1/8[EB,G,]1/8[EB,G,]1/8| [EA,F,]1/8[EA,F,]1/8[EA,F,]1/8[EA,F,]1/8
[_EA,F,]1/8[EA,F,]1/8[EA,F,]1/8[EA,F,]1/8| [_EA,=F,]1/8[EA,F,]1/8[EA,F,]1/8[EA,F,]1/8
[DA,=F,]1/8[DA,F,]1/8[D^G,F,]1/8[DG,F,]1/8| [D^G,E,]1/8[DG,E,]1/8[DG,E,]1/8[DG,E,]1/8
[D=G,E,]1/8[DG,E,]1/8[^CG,E,]1/8[CG,E,]1/8| [C=G,E,]1/8[CG,E,]1/8[CG,E,]1/8[CG,E,]1/8
[CF,E,]1/8[CF,E,]1/8[CF,E,]1/8[CF,E,]1/8| [CF,E,]1/8[CF,E,]1/8[CF,E,]1/8[CF,E,]1/8
[CF,^D,]1/8[CF,D,]1/8[CF,D,]1/8[CF,D,]1/8| [CF,=D,]1/8[CF,D,]1/8[CF,D,]1/8[CF,D,]1/8
[CF,=D,]1/8[CF,D,]1/8[CF,D,]1/8[CF,D,]1/8| [C=F,=D,]1/8[CF,D,]1/8[CF,D,]1/8[CF,D,]1/8
[B,=F,=D,]1/8[B,F,D,]1/8[B,F,D,]1/8[B,F,D,]1/8| [B,E,C,]1/8[B,E,C,]1/8[A,E,C,]1/8[A,E,C,]1/8
[A,E,C,]1/8[A,E,C,]1/8[A,E,C,]1/8[A,E,C,]1/8|
[A,E,B,,]1/8[A,E,B,,]1/8[A,^D,B,,]1/8[A,D,B,,]1/8
[A,E,C,]1/8[A,E,C,]1/8[A,E,C,]1/8[A,E,C,]1/8|
[A,^D,B,,]1/8[A,D,B,,]1/8[A,D,B,,]1/8[A,D,B,,]1/8
[A,E,C,]1/8[A,E,C,]1/8[A,E,C,]1/8[A,E,C,]1/8| [A,^D,B,,]1/4z1/4 z1/2|
[EB,G,]1/8[EB,G,]1/8[EB,G,]1/8[EB,G,]1/8 [EB,G,]1/8[EB,G,]1/8[EB,G,]1/8[EB,G,]1/8|
[EA,F,]1/8[EA,F,]1/8[EA,F,]1/8[EA,F,]1/8 [_EA,=F,]1/8[EA,F,]1/8[EA,F,]1/8[EA,F,]1/8|
[_EA,=F,]1/8[EA,F,]1/8[DA,F,]1/8[DA,F,]1/8 [D^G,=E,]1/8[DG,E,]1/8[DG,E,]1/8[DG,E,]1/8|
[D=G,=E,]1/8[DG,E,]1/8[^CG,E,]1/8[CG,E,]1/8

```



```
In [ ]: abchs x
        ----
        chopin it
```

---

**12.5** - We now want to know how many notes await us in the chords of `chopin2`. Complete the following cell to obtain this result:

```
In [ ]: ( t , r ) = unzip chopin2
        ----
        .....
```

---

**12.6** - We now want to decompose the chords `chopin2` horizontally, into as many melodic lines as necessary. This is what you get by running the next cell:

```
In [ ]: lines = horiz chopin2
```

How many melodic lines were generated? Ask this question in the following cell:

```
In [ ]:
```

---

**12.7** - We will now want to eliminate repeated successive notes, which are frequent here due to having been extracted from eighth note chords. For example (run):

```
In [ ]: ( chopin . nrep . head ) lines
```

---

**12.8** - Compare what was obtained above with something we heard previously:



```
%%MIDI program 1 68
%%MIDI program 2 20
%%MIDI program 3 20
%%MIDI program 4 20
%%MIDI program 5 42
```

3. And what happens if you add the line

```
%%staffnonote 0
```

at the beginning of the generated ABC?

Listen to the effect of these changes - what kind of music do you think was achieved?

In [ ]:

```
abcShow
```

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