Getiing started with normaliz – here

The following instructions refer to the installation of `normaliz` for the Ottawa workshop. Depending on your installation you will have to replace the path `c:/cygwin/usr/local/` leading to the `normaliz` directory.

If you have installed `normaliz` yourself under a different operating system, please replace the executables in `normaliz/bin` by the appropriate ones.

1. Open 2 copies of `MS Word` or another editor that understands Unix and Windows text files.
2. Open the Cygwin bash on the desktop
3. In the bash
   `cd c:/cygwin/usr/local/normaliz/examples`.
4. As a first test, issue the command `../bin/normaliz rafa2310` in the bash. It is the easiest solution at this point to use the relative path from the examples directory to the directory containing the executables.
5. Open `rafa2310.in` and `rafa2310.out` in your editor to study the input and output files of `normaliz`. In particular note the last line of the `in` file containing a single digit, the *mode*. The potential modes are `0,1,2,3`.
6. Open the file `normaliz.pdf` in `normaliz/doc` in Acrobat reader to read more about the format of the input and output files and the command line options. In particular use the `-h` option to see the computation of h-vectors and Hilbert polynomials in the homogeneous case.
7. Try `rees.in`. It demonstrates the computation of Rees algebras of monomial ideals.
8. Also try `enormalz` instead of `normaliz`. It handles arbitrarily large integers.
9. Play with the command line options and have a look at the various output files created with the `-f` or the `-a` option (in addition to the `out` file).
10. We start the Singular/Normaliz cooperation.

11. Open Singular in Emacs. From now on we are in Singular.

12. `LIB "‘normaliz.lib";`

13. `set_nmz_exec_path("c:/cygwin/usr/local/normaliz/bin");`

14. `set_nmz_data_path("c:/cygwin/usr/local/normaliz/examples");`

15. Open `nmz_sing.pdf` from `normaliz/Singular` and read it along with your experiments.

    Since `normaliz` is not integrated into Singular, the communication channels had to be set up, as done by the previous two commands. If you don't set the data path, the Singular home directory will be used.

16. As a first test, try the following example in Singular:

    ```
    ring R=0,(x,y,z,t),dp;
    ideal I=x2,y2,z2;
    normal_toric_ring(I);
    ```

    Output: the generators of the normalization of $K[x^2, y^2, z^2]$ – of course x^2, y^2, z^2.

    ```
    intcl_toric_ring(I);
    ```

    Output: the generators of the integral closure of $K[x^2, y^2, z^2]$ in $K[x, y, z]$ – of course x, y, z.

    ```
    intcl_mon_ideal(I);
    ```

    Output: a list of two "ideals": the first list contains the generators of the integral closure of I, the second the generators of the normalization of the Rees algebra where the variable t is used in the usual way.