**How to use program LCEQUIVALENCE v 1.0 ( module of QextNewEdition)**

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* **About LCequivalence:**

This program is designed to obtain the inequivalent codes in a set of linear codes over a finite field GF(q) for q<65 as well as nonisomorphic binary matrices. Moreover, the program calculates authomorphism groups and orbits. The use does not require special programming language skills.

* **Installation:**

No installation required. You only need to create a directory with a name you choose and download a version of the program that corresponds the operating system you are using - Linux or Windows.

* **Starting:**

3.1) For Windows - Run the program like any other executable program.

3.2) For Linux - The program is a console application and therefore should be started with the following commands:

**./LCequivalence**

or

**chmod +x LCequivalence** //after that

**./LCequivalence**

!!!Important!!! To run properly, you need to run a single copy in a directory!

* **User interface:**

Seven different options can be selected after starting:

1. Calculate inequivalent codes

2. Calculate inequivalent matrices

3. What to print in the output file for codes

4. What to print in the output file for matrices

5. Change the name of the input file

6. Random codes - write in a file with name 'RES\_DIR0//EXAM.'

7. Random quasi-cyclic codes - write in a file with name 'RES\_DIR0//EXAM.'

* **Some explanation**

As an input the program **LCequivalence** uses atext fail with generator matrix of linear codes in the form described in the previous version of Q-Extension. The file should be in a subdirectory with the name “RES\_DIR0”. The results will be written in a file with the same name but extended with ”\_r”. There is no limit for the number of codes in the input file.

To see the format for writing generator matrices one can run point 6 or 7 in the beginning.

The polynomials which we use to generate the composite fields are:

GF(4) α^2 + α + 1

GF(8) α^3 + α + 1

GF(9) α^3 +2^α +2

GF(16) α^4 + α + 1

GF(25) α^2 + α + 2

GF(27) α^3 + 2α + 1

GF(32) α^5 + α^2 + 1

GF(49) α^2 + α + 3

GF(64) α^6 + α + 1

The elements of the field can be presented as **q=p^s** polynomials of degree s-1 whose coefficients are integers modulo p (of degree 0 for prime fields).

In the polynomial r(x) we replace x by p and calculate the obtained sum. This sum is the number of the element r(x). Using these numbers, we can order the elements of the field.

For more details and information on the form of the results and the intermediate inscriptions, see the previous version of Q-Extension.

If you have any questions or comments, please do not hesitate to email me at [iliyab@math.bas.bg](mailto:iliyab@math.bas.bg)

* **Results and Download:** can be found in the address:

<http://www.moi.math.bas.bg/moiuser/~data/Software/QextNewEditionLCequiv.html>