How to use the program WDHV v1.0

(a module in QextNewEdition)

Iliya Bouyukliev
Institute of Mathematics and Informatics
Veliko Tarnovo, Bulgaria

1. About WDHV:

This program is designed to calculate the weight distribution of linear codes over finite fields. The use does not require special programming language skills.

2. 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 to the operating system you are using - Linux or Windows.

3. 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:

./ WDHV

or

chmod +x WDHV //after that

./ WDHV

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

4. User interface:

Three different options can be selected after starting:

1. Start computation
2. Change input file
3. Generate random codes in the file ‘EXAM.txt’

5. Some explanation

If you select 1 directly, the program will calculate the weight distribution of linear codes with generator matrices in the file "EXAM.txt" and will record the results in the file "EXAM.txt_r". The form of the generator matrices is the same as in the package "Q-Extension":

http://www.moi.math.bas.bg/~iliya/Q_ext.htm

If you want to change the name of the input file, you should choose 2. With point 3 you can generate 'number' randomly codes with the same parameters. The generator matrices will be written in the file 'EXAM.txt'. For the correctness of the results for the codes with small length you can use program 'tools' from the package 'Q-Extension'.

Practically, there is no limit for the length of the codes in WDHV, but maximum dimension strictly depends on the size of the memory of the computer. For example, in the case of 8Gb RAM WDHV works for maximum dimension k=30 for q=2; k=18 for q=3; k=15 for q=4; k=12 for q=5; k=10 for q=7. The program WDHVs is the same as WDHV but the size of basic data type is two times smaller. Therefore, WDHVs can be used for binary codes with maximum dimension 31 (in 8GB RAM) but the lenght is limited by 2^14. For linear codes over other fields WDHVs works with similar restrictions.

If you have any questions or comments, please do not hesitate to email me at iliyab@math.bas.bg

6. Additional:

This software is implementation of the algorithm of the manuscript:
"Characteristic vector and weight distribution of a linear code" by Bouyukliev, Bouyuklieva, Maruta and Piperkov.

The source code (unpolished) of the program is also available.

About QextNewEdition:
http://www.moi.math.bas.bg/moiuser/~data/Software/QExtNewEdition.html