envir

V.1.0.1

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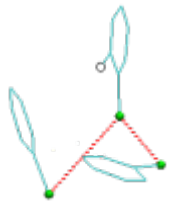
envir



1.1 Introduction

About this program:

- Program that searchs environment for chosen molecule by geometric criterion

Developer:

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License:

- GPL

1.2 How to use

Usage:

```
envir -i FILENAME -c X,Y,Z -o FILEMANE [ -n NUM_OF_MOLECULE ] [ -r RADIUS ]
                                                [ -l LOGFILE] [ -q ] [ -h ]

Parametrs:
   -i          - input file with coordinates
   -c          - cell size (float), A
   -o          - output file with coordinates
   -n          - number of molecule for search (integer). Default is 1
   -r          - radius of environment (float). Default is 6.0
   -l          - log enable
   -q          - quiet enable
   -h          - show this help and exit
```

Chapter 2

Install

2.1 Requirements

The application statgen requires the following external stuff:

- cmake >= 2.8
- gcc >= 4.8

2.2 How to install

2.2.1 Linux

```
mkdir build && cd build
cmake -DCMAKE_INSTALL_PREFIX=/usr -DCMAKE_BUILD_TYPE=Release ../
make
make install
```

2.2.2 Windows

```
create project file using 'cmake'
compile project
```

You may also download compiled executable file for Win_x86.

Chapter 3

Changelog

V.1.0.1 (2013-07-27)

- initial release

Chapter 4

File Index

4.1 File List

Here is a list of all files with brief descriptions:

Chapter 5

File Documentation

5.1 about.dox File Reference

5.2 src/add_main.c File Reference

```
#include <stdio.h>
#include "messages.h"
```

Functions

- int error_checking (const float *cell, const char *input, const char *output)

  function that checks errors in input variables
- int print_message (const int quiet, FILE *std_output, const int log, FILE *f_log, const int mode, const char *str)

  function that prints message in log and stdout
- int set_defaults (float *cell, char *input, int *log, int *num_of_mol, char *output, int *quiet, float *rad)

  function for set default values of variables

5.2.1 Function Documentation

5.2.1.1 int error_checking (const float * *cell*, const char * *input*, const char * *output*)

function that checks errors in input variables

```
error_checking (cell, input, output);
```

Parameters

cell	massive of cell size
input	first trajectory step
output	last trajectory step

Returns

11 - error in 'cell'
12 - error in 'input'
13 - error in 'output'
0 - exit without errors

5.2.1.2 int print_message (const int *quiet*, FILE * *std_output*, const int *log*, FILE * *f_log*, const int *mode*, const char * *str*)

function that prints message in log and stdout

```
print_message (quiet, stdout, log, f_log, 0, str);
```

Parameters

quiet	status of quiet-mode
std_output	stdout
log	status of log-mode
f_log	log file
mode	number of message in "messages.c"
str	additional text in message

Returns

0 - exit without errors

5.2.1.3 int set_defaults (float * *cell*, char * *input*, int * *log*, int * *num_of_mol*, char * *output*, int * *quiet*, float * *rad*)

function for set default values of variables

```
set_defaults (cell, &from, input, &log, &max_depth, &num_of_inter, output, &to,
              &type_inter, &quiet);
```

Parameters

cell	massive of cell size
input	mask of trajectory files
log	status of log-mode
num_of_mol	number of molecule
output	output file name
quiet	status of quiet-mode
rad	radius of environment sphere

Returns

0 - exit without errors

5.3 src/coords.c File Reference

```
#include <stdio.h>
#include <stdlib.h>
```

Functions

- int reading_coords (const int mode, const char *filename, const int type_inter, const int *label_atom, const float *cell, int *num_mol, int *num_atoms, int *true_label_mol, int *label_mol, int *type_atoms, float *coords, char *ch_type_atoms)

  function that reads coordinates from special file format

5.3.1 Function Documentation

5.3.1.1 int reading_coords (const int *mode*, const char * *filename*, const int *type_inter*, const int * *label_atom*, const float * *cell*, int * *num_mol*, int * *num_atoms*, int * *true_label_mol*, int * *label_mol*, int * *type_atoms*, float * *coords*, char * *ch_type_atoms*)

function that reads coordinates from special file format

```
reading_coords (0, filename, type_inter, label_atom, cell, &num_mol, &num_atoms,
                true_label_mol, label_mol, type_atoms, coords, ch_type_atoms);
```

Parameters

mode	mode of reading; '1' is statgen, '2' is envir or frad, '3' is agl
filename	input file name
type_inter	number of needed atoms (number of needed molecules)
label_atom	massive of needed atom types (massive of needed molecules)
cell	massive of cell size
num_mol	number of molecules
num_atoms	number of atoms
true_label_mol	massive of true numbers of molecule for atoms
label_mol	massive of numbers of molecule for atoms
type_atoms	massive of atom types
coords	massive of coordinates
ch_type_atoms	massive of char atom types

Returns

1 - file $filename does not exist
2 - unknown mode
0 - exit without errors

Work blocks

```
reading file

translation

free memory
```

5.4 src/envir_search.c File Reference

```
#include <math.h>
```

Functions

- int search_envir (const int num_of_mol, const int num_mol, const float *centr_coords, const double rad, int *needed_mol, int *num_needed_mol)

  function that searchs environment

5.4.1 Function Documentation

5.4.1.1 int search_envir (const int *num_of_mol*, const int *num_mol*, const float * *centr_coords*, const double *rad*, int * *needed_mol*, int * *num_needed_mol*)

function that searchs environment

```
search_envir (number_of_molecule, num_mol, centr_coords, rad, needed_mol,
              &num_needed_mol);
```

Parameters

num_of_mol	number of molecule
num_mol	number of molecules
centr_coords	massive of centered coordinates
rad	radius of environment sphere
needed_mol	massive of number of needed molecules
num_needed_mol	number of needed molecules

Returns

0 - exit without errors

5.5 src/main.c File Reference

```
#include <math.h>
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include "add_main.h"
#include "coords.h"
#include "envir_search.h"
#include "messages.h"
#include "print_struct.h"
#include "set_center.h"
```

Functions

- int main (int argc, char *argv[])

5.5.1 Function Documentation

5.5.1.1 int main (int *argc*, char * *argv[]*)

Returns

1 - error in error_checking
2 - input file does not exist
3 - memory error
0 - exit without errors

5.6 src/messages.c File Reference

```
#include <stdio.h>
#include <time.h>
```

Functions

- int message (const int log, const int mode, const char *text, FILE *output)

  function that prints messages to output

5.6.1 Function Documentation

5.6.1.1 int message (const int *log*, const int *mode*, const char * *text*, FILE * *output*)

function that prints messages to output

```
message (log, mode, text, output);
```

Parameters

log	equal to 1 if print to logfile
mode	number of message
text	additional text
output	output file (may be stdout)

Returns

0 - exit without errors

5.7 src/print_struct.c File Reference

```
#include <stdio.h>
```

Functions

- int print_structure (const char *output, const int num_needed_mol, const int *needed_mol, const int num_atoms, const int *label_mol, const char *ch_type_atoms, const float *coords)

  function that prints structure to pdb file

5.7.1 Function Documentation

5.7.1.1 int print_structure (const char * *output*, const int *num_needed_mol*, const int * *needed_mol*, const int *num_atoms*, const int * *label_mol*, const char * *ch_type_atoms*, const float * *coords*)

function that prints structure to pdb file

```
print_structure (output, num_needed_mol, needed_mol, num_atoms, label_mol,
                 char_type_atoms, coords);
```

Parameters

output	output file name
num_needed_mol	number of needed molecules

needed_mol	massive of number of needed molecules
num_atoms	number of atoms
label_mol	massive of numbers of molecule for atoms
ch_type_atoms	massive of char atom types
coords	massive of coordinates

Returns

0 - exit without errors

5.8 src/set_center.c File Reference

Functions

- int set_center (const int num_atoms, const int num_mol, const int *label_mol, const float *coords, float *centr_coords)

  function that searchs center mass of molecules

5.8.1 Function Documentation

5.8.1.1 int set_center (const int *num_atoms*, const int *num_mol*, const int * *label_mol*, const float * *coords*, float * *centr_coords*)

function that searchs center mass of molecules

```
set_center (num_of_atoms, num_of_molecules, label_molecules, coords, centr_coords);
```

Parameters

num_atoms	number of atoms
num_mol	number of molecules
label_mol	massive of numbers of molecule for atoms
coords	massive of coordinates
centr_coords	massive of centered coordinates

Returns

0 - exit without errors

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