# DEOM

## FILE

This includes two-part(bose and fermi) of HEOM(Hierarchical equations of motion):

1. bose: boson bath and boson system
2. fermi: fermi bath and fermi system
3. docker: docker image builder

and as the name of the folder indicate, 1d-corr means in that folder, you can calculate the equilibrium state of a given system, and calculate the correlation function of that. The sto_quad folder contains a stochastic algorithm to calculate quad system-bath coupling.

## INSTALL

You should consider trying docker, docker image builder is in /docker folder. And note if you are in USTC, a harbor service that contains this image can be provided, you can contact us. (DO NOT ask me for docker hub things, too slow.)
In the /docker folder, we only provide Dockerfile, you have to download those software and modified Dockerfile yourself:

1. eigen
2. folly
    1. googletest-release
    2. fmt
    3. gperftools
    4. jemalloc(get into trouble? click it!)
3. json11

DO NOT forget to modified version number in Dockerfile.

## BREIF

This is a HEOM calculator which ulize hashmap to do parallize filter. Technical detials is very simple: There are three things we need to do:

1. Store all density matrices
2. Look for the density matrix used
3. Calculate the super operator and calculate the $dotrho^(n)_{/bf n}$

in step 1 and step 2 we will use an atomic hash map to do search things. In step 3, we can do it by using an embrassing paralell algorithm.

## NOTE

We WON NOT provide input file samples in some applications due to that part of the work is not complete.

## translation

English document is up to here, 下面是中文文档。

## 文件

这包括 HEOM（分层运动方程）的两部分（玻色和费米）：

1. bose：玻色子浴和玻色子系统
2. fermi：费米浴和费米系统
3. docker: docker 镜像构建器

正如文件夹名称所示，1d-corr 表示在该文件夹中，您可以计算给定系统的平衡状态，并计算其相关函数。

## 安装

您应该考虑尝试 docker，docker image builder 位于 /docker 文件夹中。请注意，如果您在中国科学技术大学，可以提供包含此图像的港口服务，您可以联系我们。 （不要问我关于 docker hub 的事情，太慢了。）

## 注意

由于部分工作未完成，我们不会在某些应用程序中提供输入文件示例。