Back Propogation report

icf

October 2017

1 Back Propagation in CPMC-Lab

The problem will be solved in five steps:

1) Pre-analysis

2) Matlab Program Modification

3) Input

4) Output

5) Discussion

Notice:
Calculation used the running parameters below if no special mention:
deltau=0.01;
N_wlk=100;
N_blksteps=300;
N_eqblk=3;
N_blk=10;
itv_modsvd=5;
itv_pc=10;
itv_Em=50;

1.1 Pre-analysis

1. Remember all the walkers at the detect point and the x (Auxiliary field) from this point to the next detect point .

2. Adjust the remembered data with popcotrol.

3. At the next detect point, using back propagation of $|\phi_T>$ along x_i for each walker i.

4. Use the remembered date and Back Propagation Formula to calculate average values of operators in Groundstate.

System Data	(kx,ky)	$< K >$ $< K >_{bp}$	$< V >$ $< V >_{bp}$	$< K >_{mixed}$ $< K >_{bp\ err}$	$< V >_{mixed}$ $< V >_{bp\ err}$
2*4	(+0.0819,-0.6052)	-13.7778	1.65680	-14.3892	2.2609
2.1.mat		-13.7413	1.6431	0.03744	0.00736
3*4	(+0.02,0.04)	-15.2849	1.29311	-15.9954	2.0002
2.2.mat		-15.2905	1.3176	0.035	0.0081
4*4	(0,0)	-22.5219	2.94100	-24	4.4205
2.3.mat		-22.5744	3.0185	0.0395	0.0101

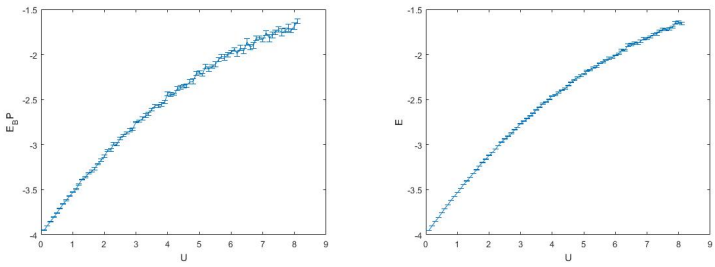
Table 1: $< V >_{mixed}$, $< K >_{mixed}$ are calculated mixed results of Kinetic and Potential Energy, $< V >$, $< K >$ are Ground State Kinetic and Potential Energy and $< V >_{bp}$, $< K >_{bp}$ are back propagation Ground State Kinetic and Potential Energy. (The accuracy can be improved by increasing ite_Em.)

1.2 Matlab Program Modification

batchsample_U_BP.m;
CPMC_Lab_BP.m;
measure_BP.m;
pop_cntrl_BP.m;
stblz_BP.m;
stepwlk_AP.m;
stepwlk_BP.m;
V_AP.m;
V_BP.m;

1.3 Input/Output

Table 1;
Figure 1; 2.4.mat;



(a) The curve is $< H >_{bp}$ vs. U. The error is larger than (b) because the error from back propagation.

(b) The curve is $< H >$ vs. U.

Figure 1: