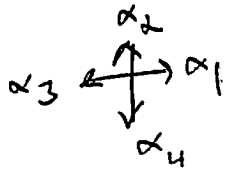
Lattice Gas Sim. – Chapter 10. Notes – * See Matlab code *

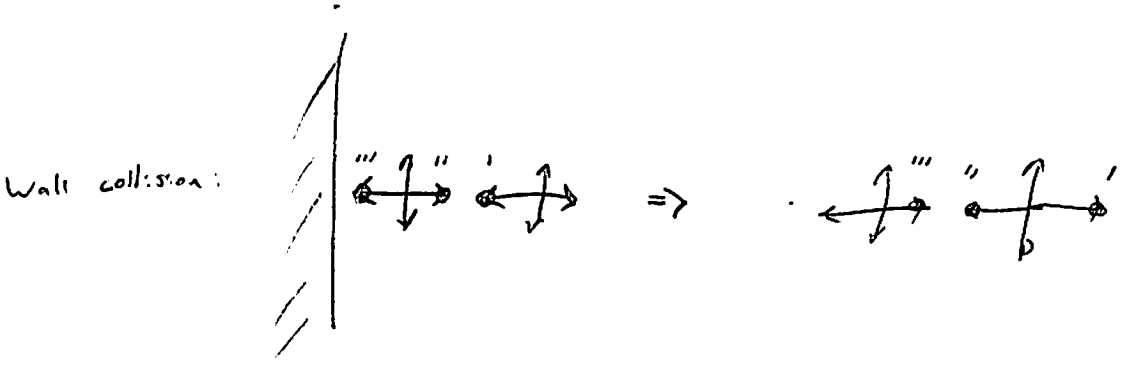
4/8/2014

C.W.



Cell notation:

α_1	α_2
α_3	α_4



✓ Case I:

If:	Walls: Then:	code: (@ t+1:)
$x=1$ & $(x,y)\{1,2\}$	left: $\alpha_3 = 1 \Rightarrow \alpha_1' = 1$	α
	right: $\alpha_1' = 1 \Rightarrow \alpha_3' = 1$	
	top $\alpha_2 = 1 \Rightarrow \alpha_4 = 1$	
	bottom: $\alpha_4 \Rightarrow \alpha_2$	

Case II. collisions: 4 cases to check (if we are at node x, y).

Check occupation:	Direction:	if true; at t+1:
$(x,y)\{1,1\}$ & $(x+1,y)\{1,2\}$	$x,y \leftrightarrow (x+1,y)$	$\alpha_1(x,y)=0, \alpha_3(x,y)=1$; $\alpha_1(x+1,y)=1$, $\alpha_3(x-1,y)=0$
" $\{1,2\}$ & $(x-1,y)\{1,1\}$	$(x-1,y)$	$\alpha_1(x,y)=1$, $\alpha_3(x,y)=0$; $\alpha_1(x-1,y)=0$, $\alpha_3(x-1,y)=1$
" $\{2,1\}$ & $(x,y+1)\{2,2\}$	$(x,y+1)$	$\alpha_2((x,y))=0, \alpha_4(x,y)=1$; $\alpha_4(x,y+1)=0$, $\alpha_2(x,y+1)=1$
" $\{2,2\}$ & $(x,y-1)\{2,1\}$	$(x,y-1)$	$\alpha_2(x,y)=1$, $\alpha_4(x,y)=0$; $\alpha_4(x,y-1)=1$, $\alpha_2(x,y-1)=0$

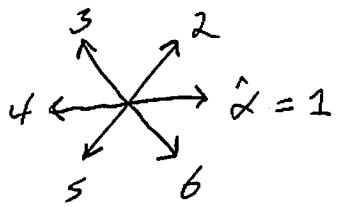
Case III: Transitions

Check occupation:	Direction	if true, at t+1:
$(x,y)(1,1)$ & $!(x+1,y)\{1,2\}$	→	
	←	

Lattice Gas - FHP model - 2D Triangular Lattice

4/15/2014

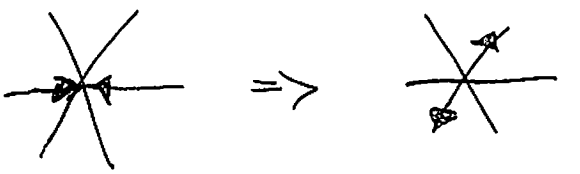
C.W.



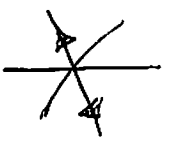
Case I: 2-body collision

Alternate between trajectories

$(t \bmod 2)$



-or-



Case II: 3-body collision

simply conserve momentum: