Machine Learning and the Iterated Prisoner's Dilemma

@NikoletaGlyn

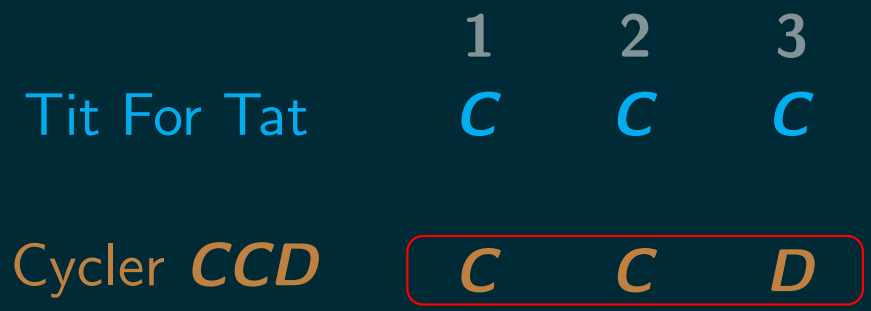
Supervised by:
Dr. Vincent Knight

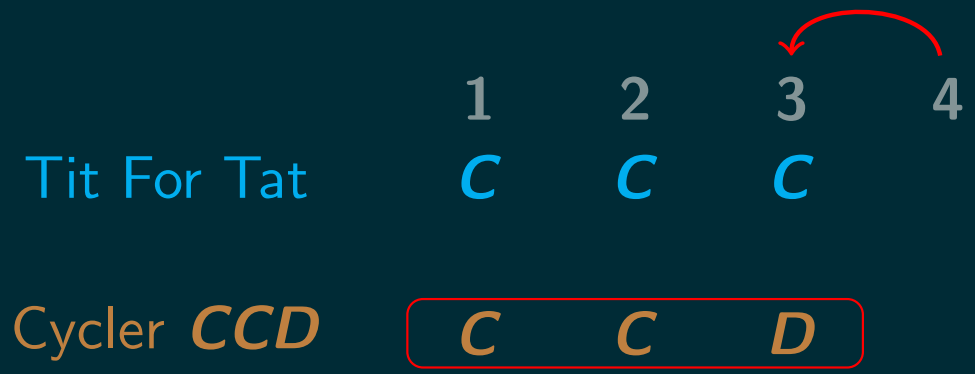
Tit For Tat

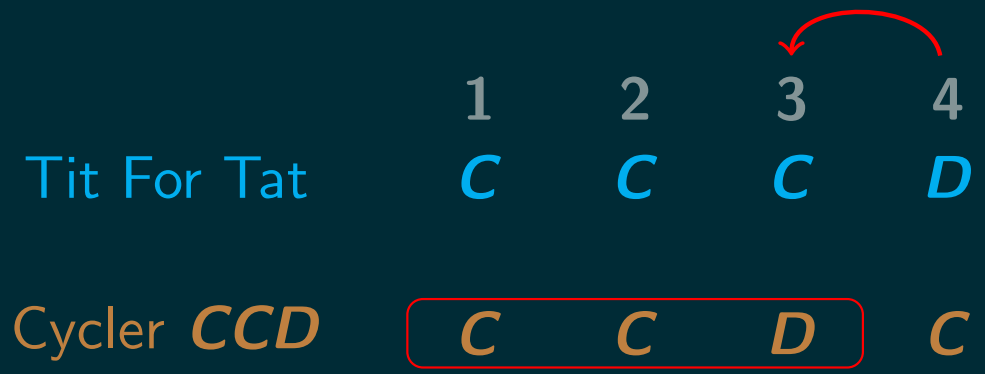
Cycler ***CCD***

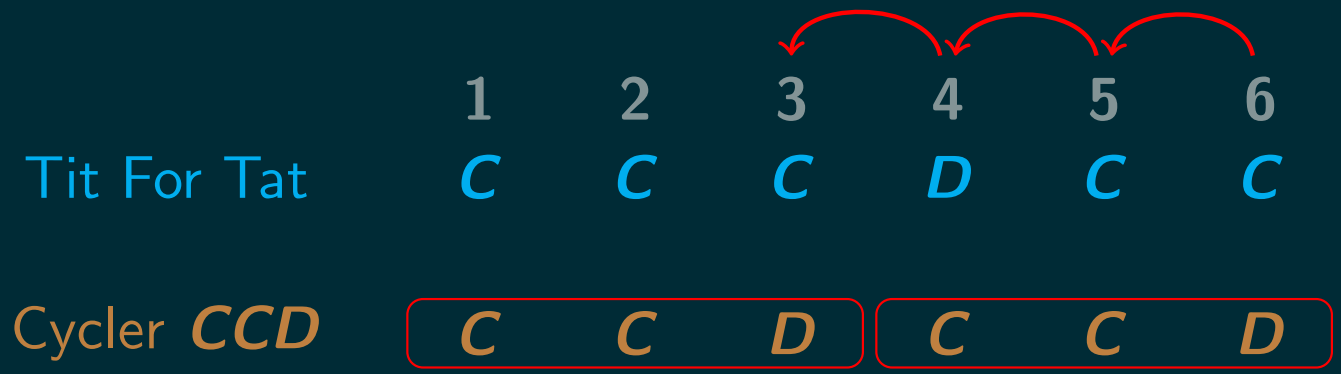
	1
Tit For Tat	***C***
Cycler ***CCD***	***C***

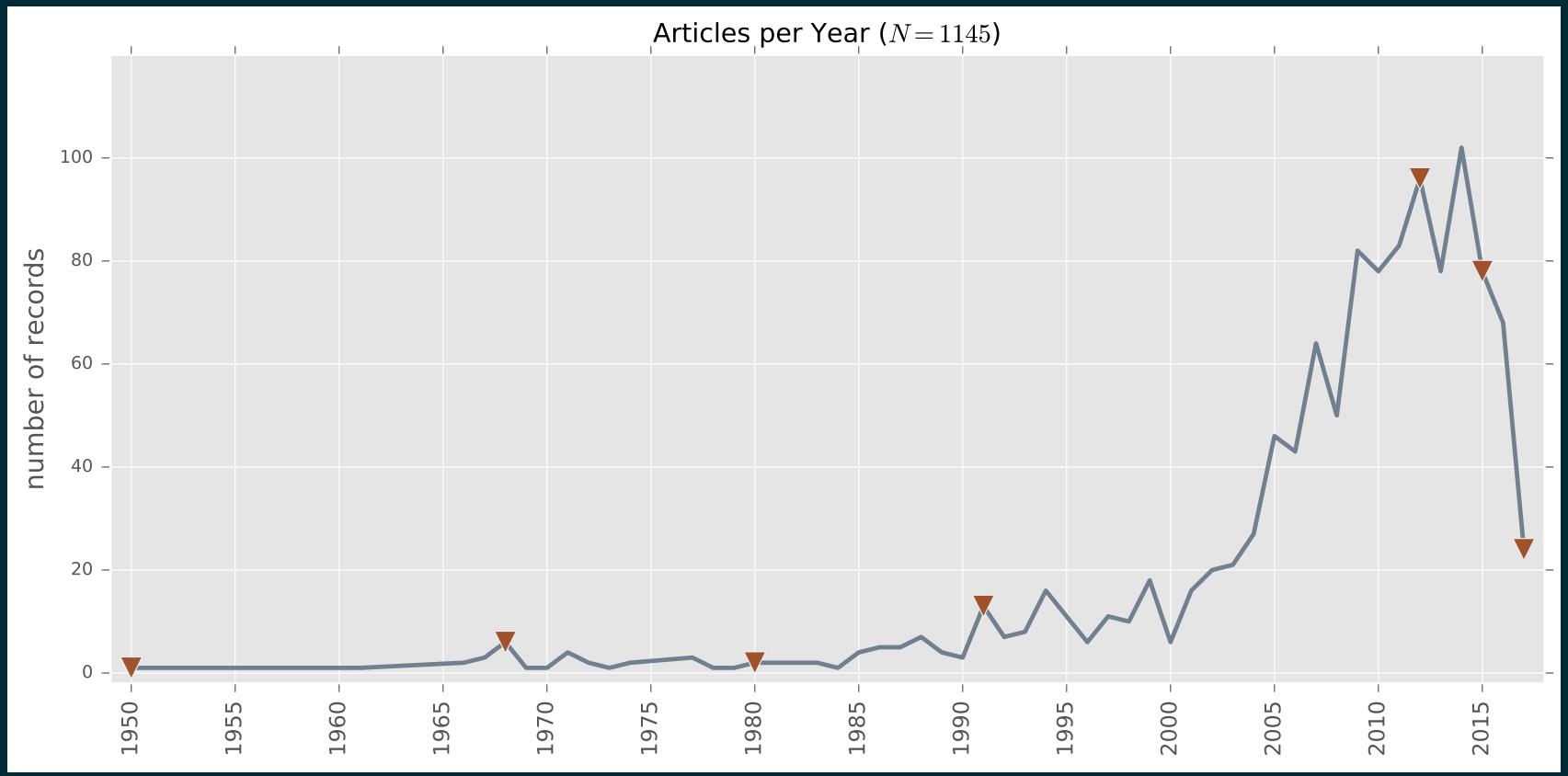
	1	2	3
Tit For Tat	*C*	*C*	*C*
Cycler *CCD*	*C*	*C*	*D*

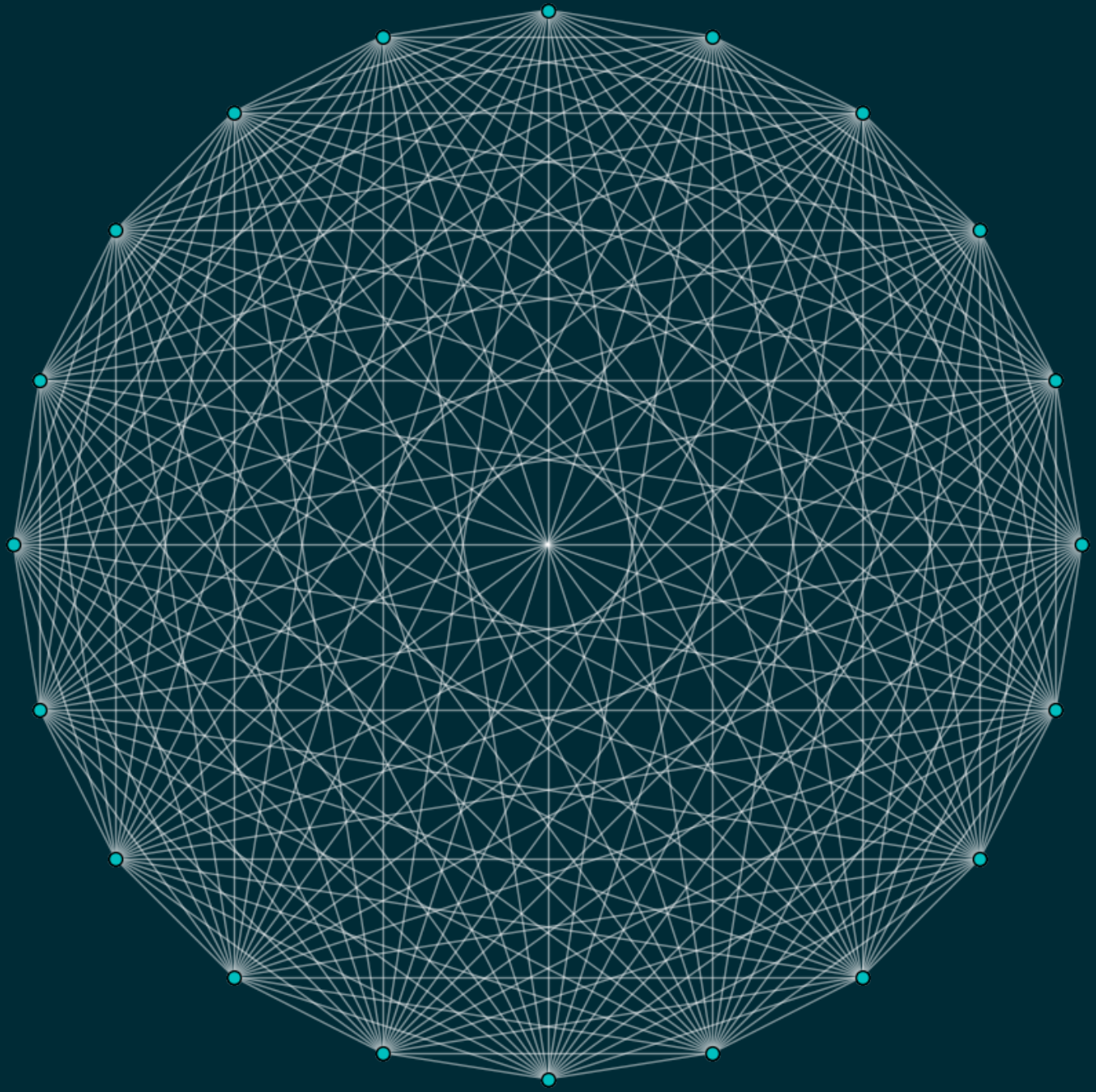

1 2 3
Tit For Tat C C C
Cycler CCD C C D

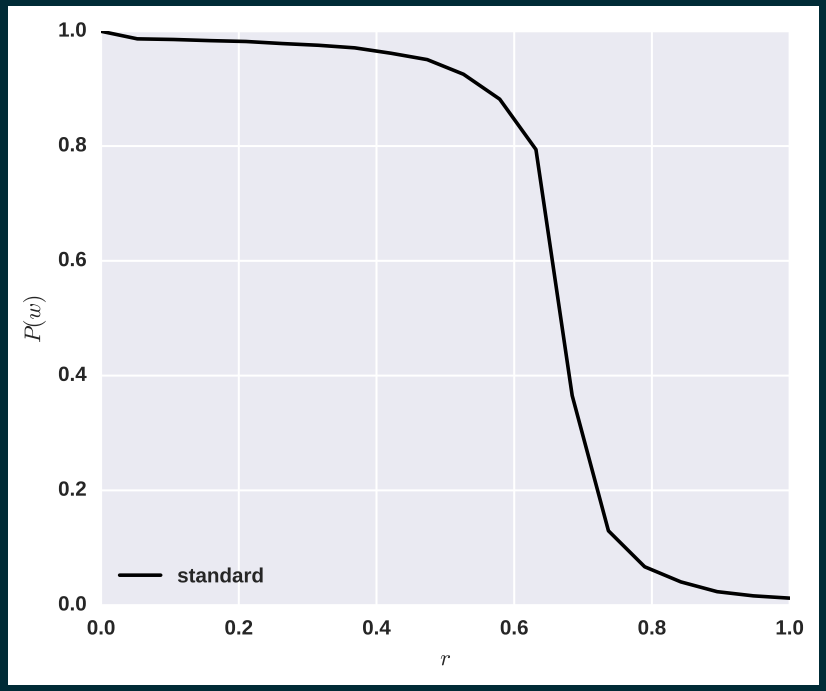

1
2
3
4
Tit For Tat
C
C
C
Cycler CCD
C
C
D

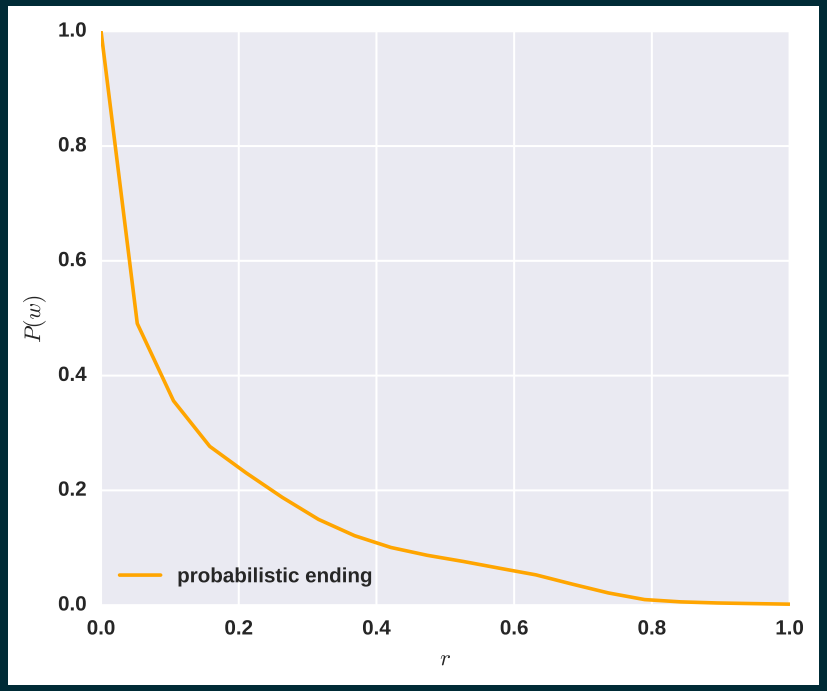

1
2
3
4
Tit For Tat
C
C
C
D
Cycler CCD
C
C
D
C

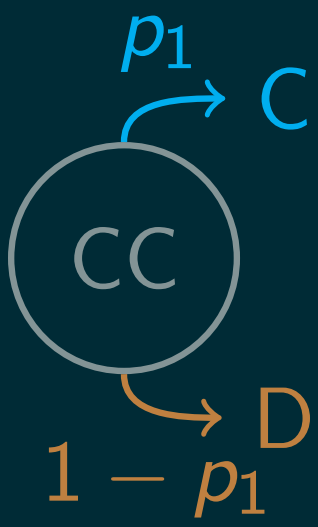

1 2 3 4 5 6
Tit For Tat
C C C D C C
Cycler CCD
C C D C C D

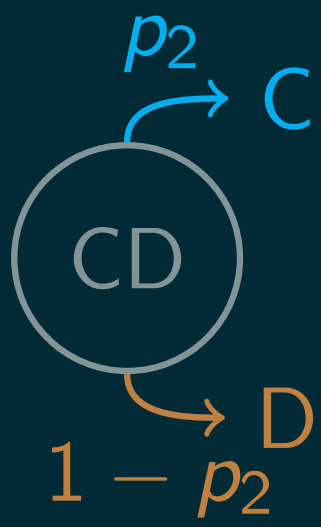

Articles per Year ($N = 1145$)
number of records
0
20
40
60
80
100
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
2015

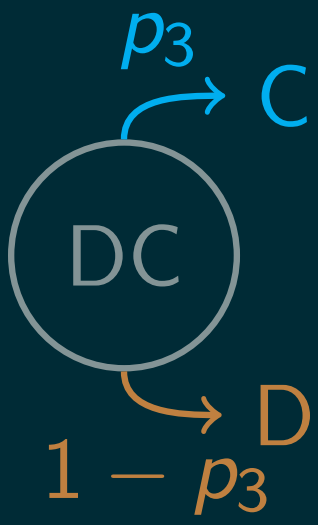


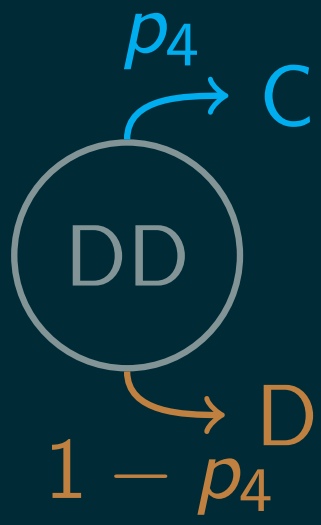

1.0
0.8
0.6
0.4
0.2
0.0
$P(w)$
standard
0.0
0.2
0.4
0.6
0.8
1.0
r


1.0
0.8
0.6
0.4
0.2
0.0
$P(w)$
probabilistic ending
0.0
0.2
0.4
0.6
0.8
1.0
r

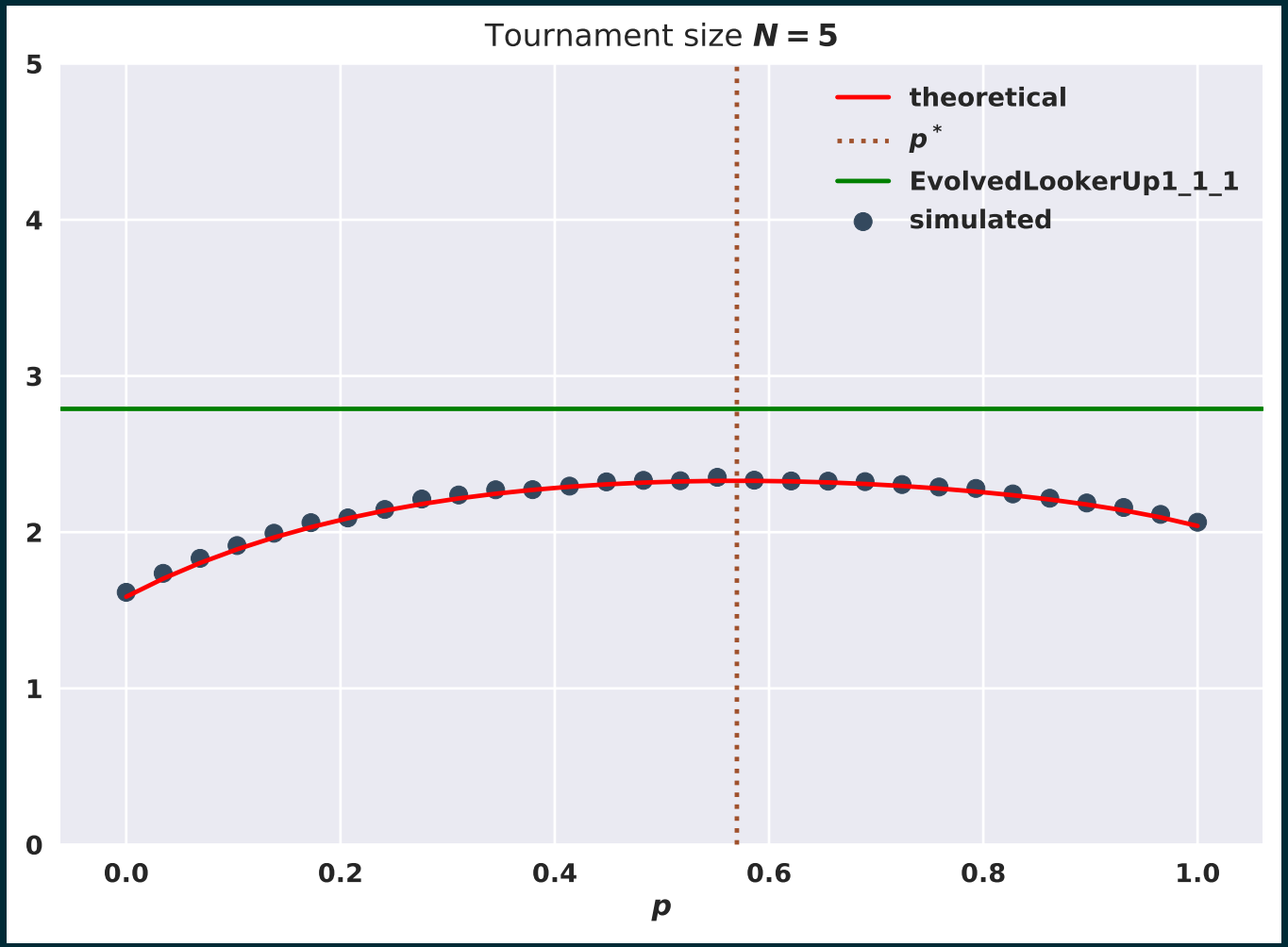
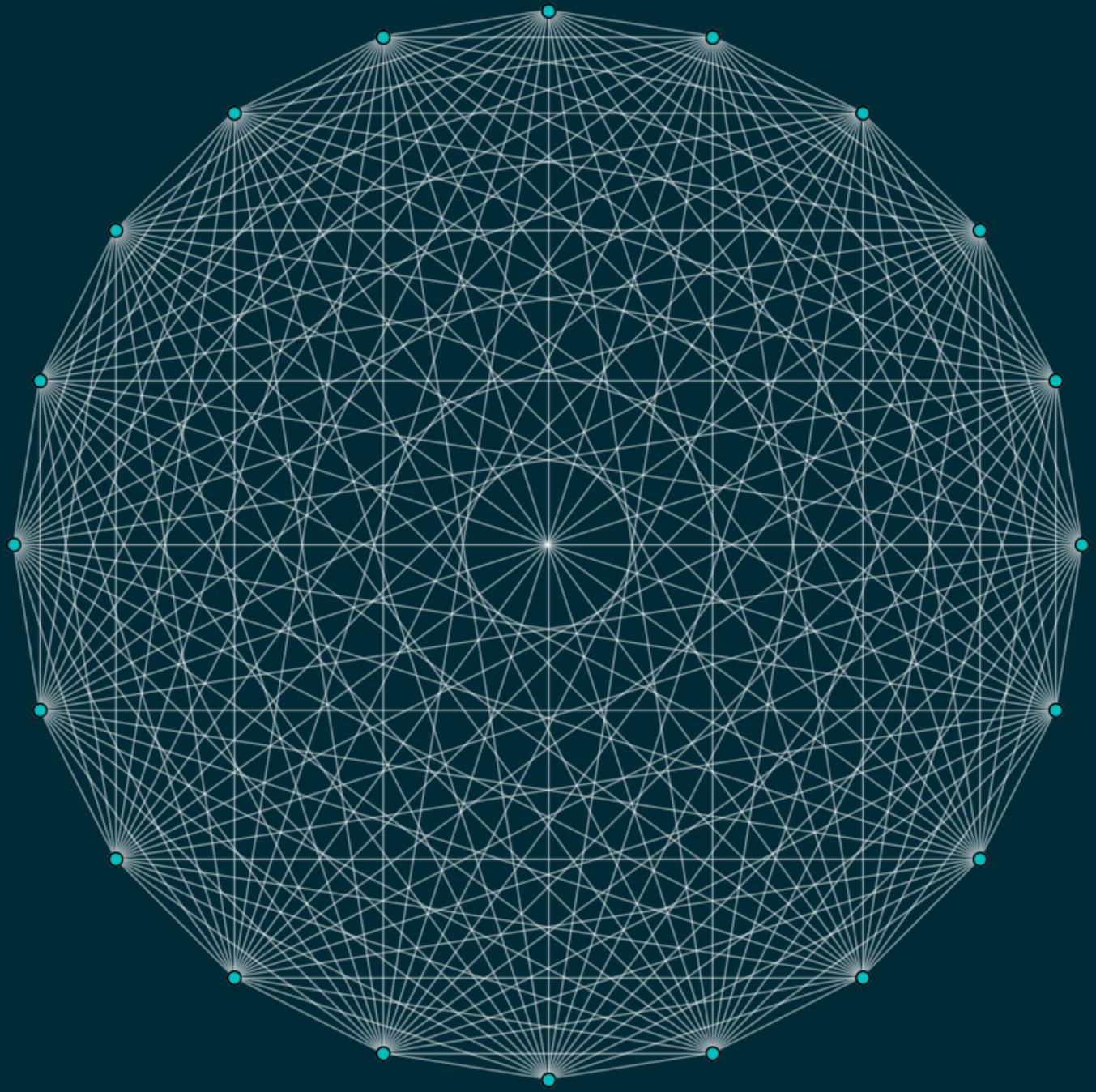
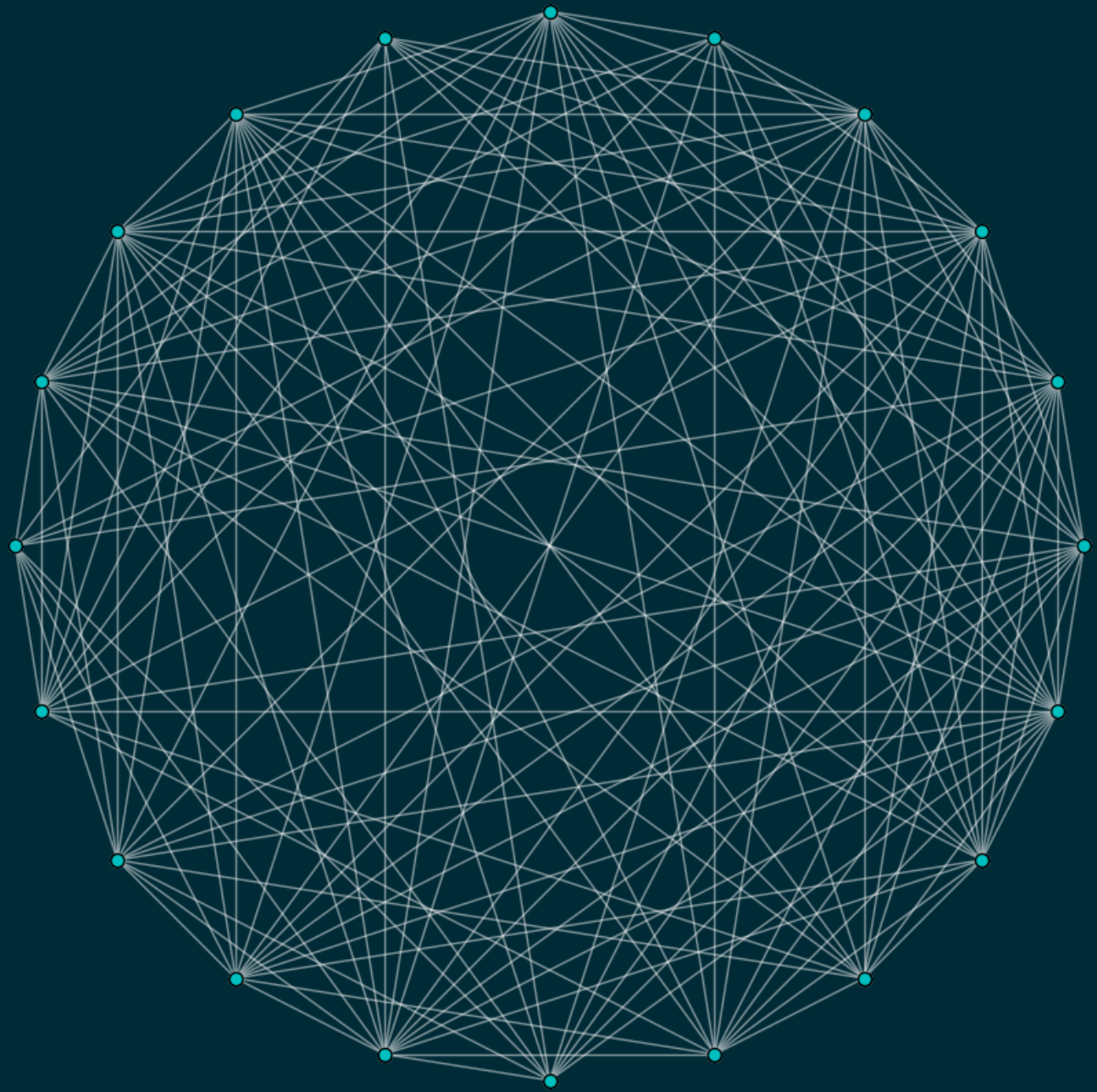

p_1
C
CC
D
$1 - p_1$


p_2
C
CD
D
$1 - p_2$


p_3
C
DC
D
$1 - p_3$


p_4
C
DD
D
$1 - p_4$

- *William Press and Freeman Dyson.* Iterated Prisoners Dilemma contains strategies that dominate any evolutionary opponent. 2012.
- *Christopher Lee, Marc Harper, and Dashiell Fryer.* The art of war: Beyond memory-one strategies in population games. 2015.


Tournament size $N = 5$
theoretical
p^*
EvolvedLookerUp1_1_1
simulated
5
4
3
2
1
0
0.0
0.2
0.4
0.6
0.8
1.0
p