Generating complete LUTs from annihilation generation rules

Generating for a given K_e or a given Bias is quick and straighforward.

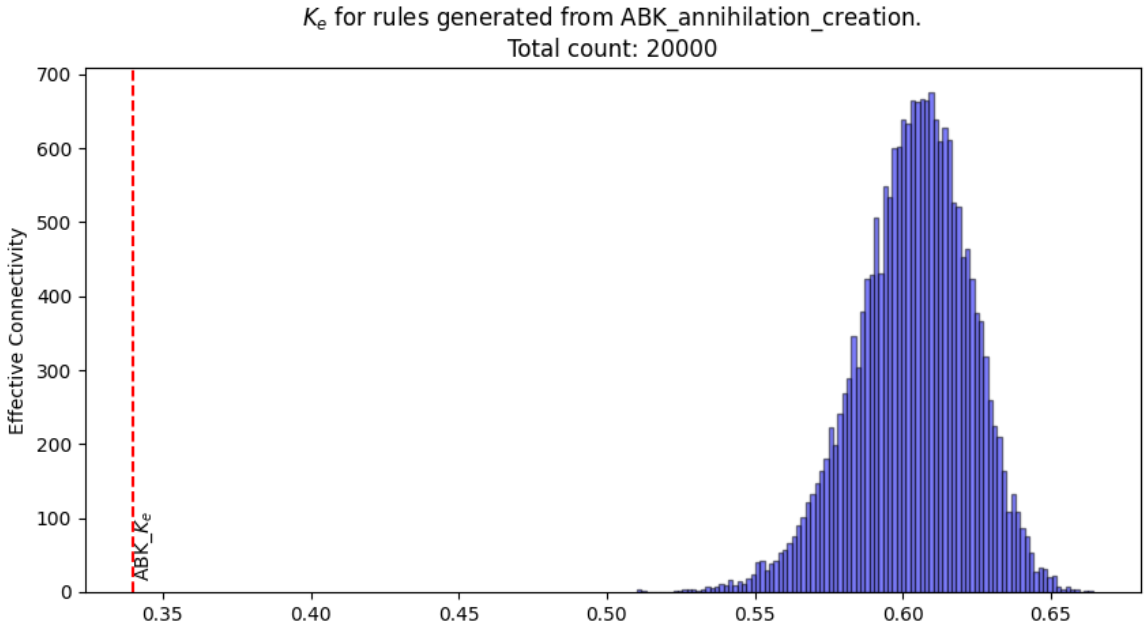
Generating new rules with parent rule bias and K_e

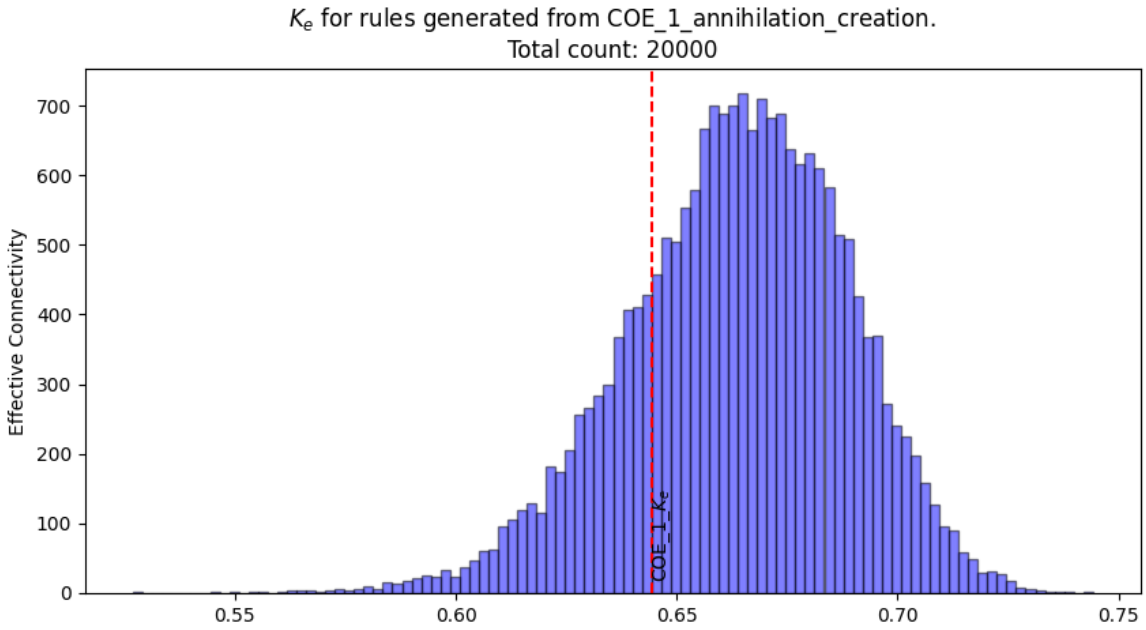
Generating LUTs similar to the parent rule's K_e and Bias (both together) is not so simple. Most famous DCT rules have a bias of 0.5. However, most rules generated with that bias tend to have a much higher K_e than the parent rule.

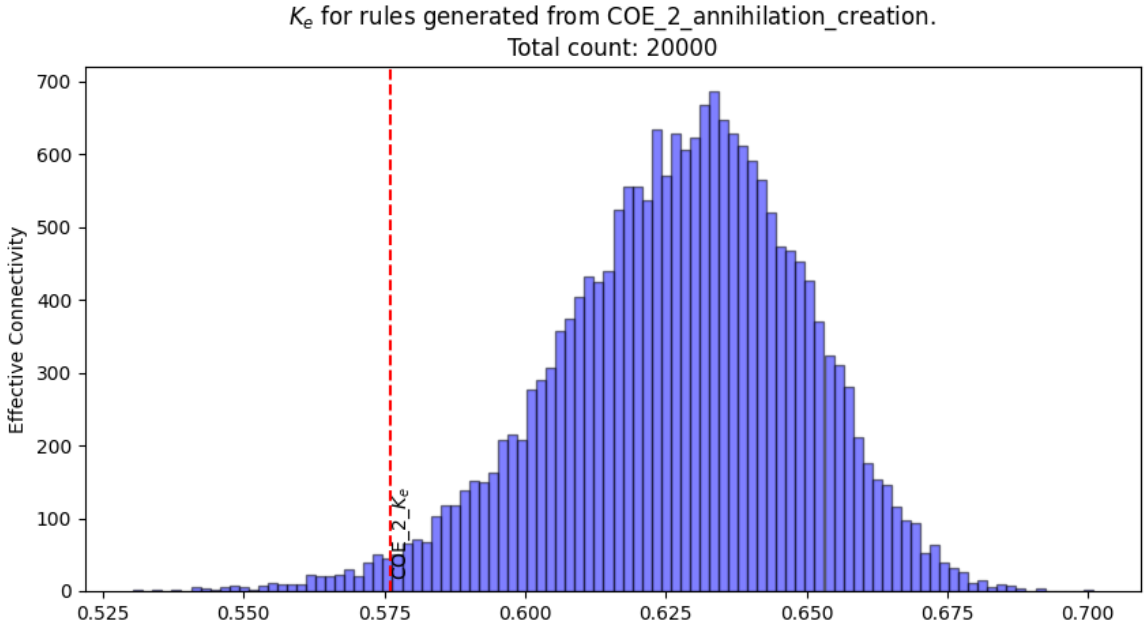
Existing DCT rules have a rare combination of Bias and K_e

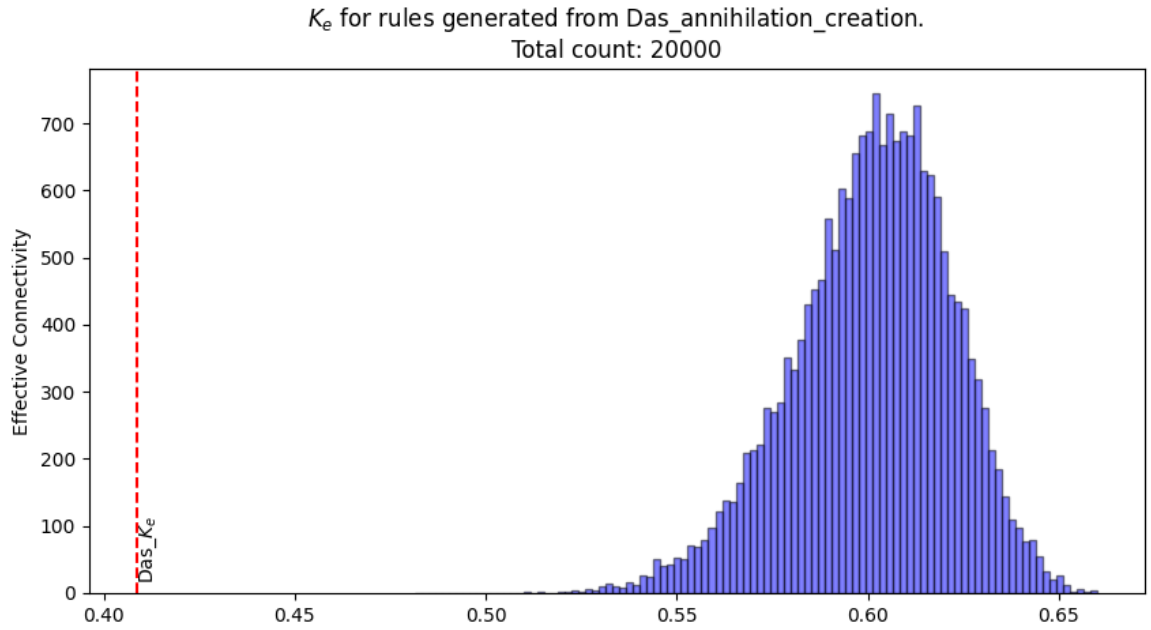
K_e of generated rules with parent rule bias

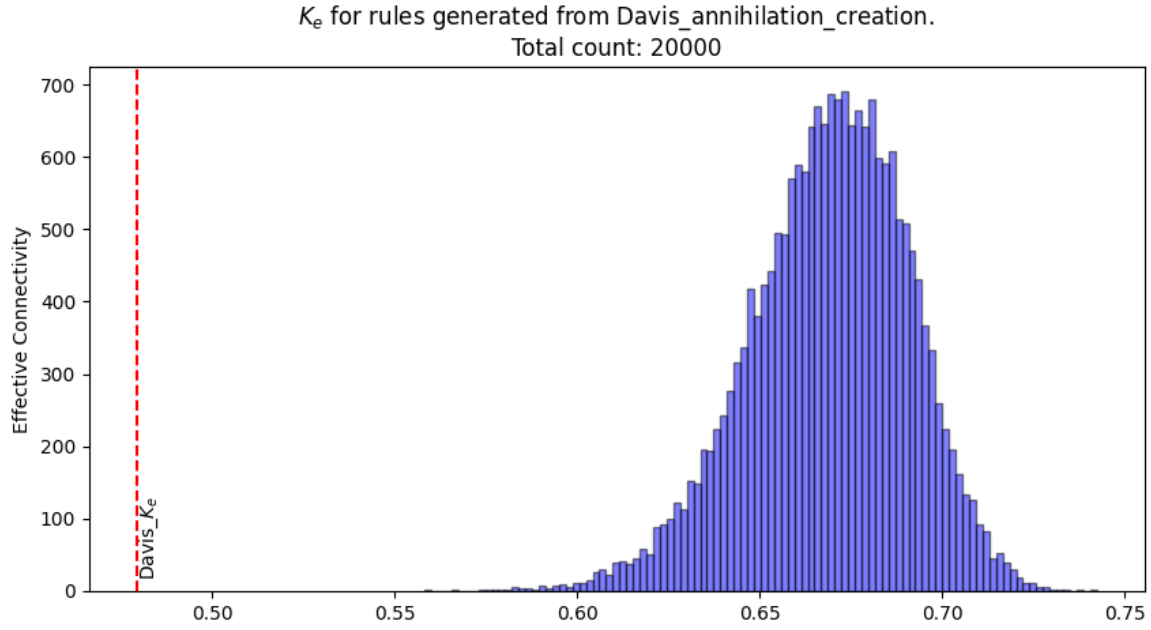
Below are the histograms of the K_e of new rules generated with the parent rule bias.

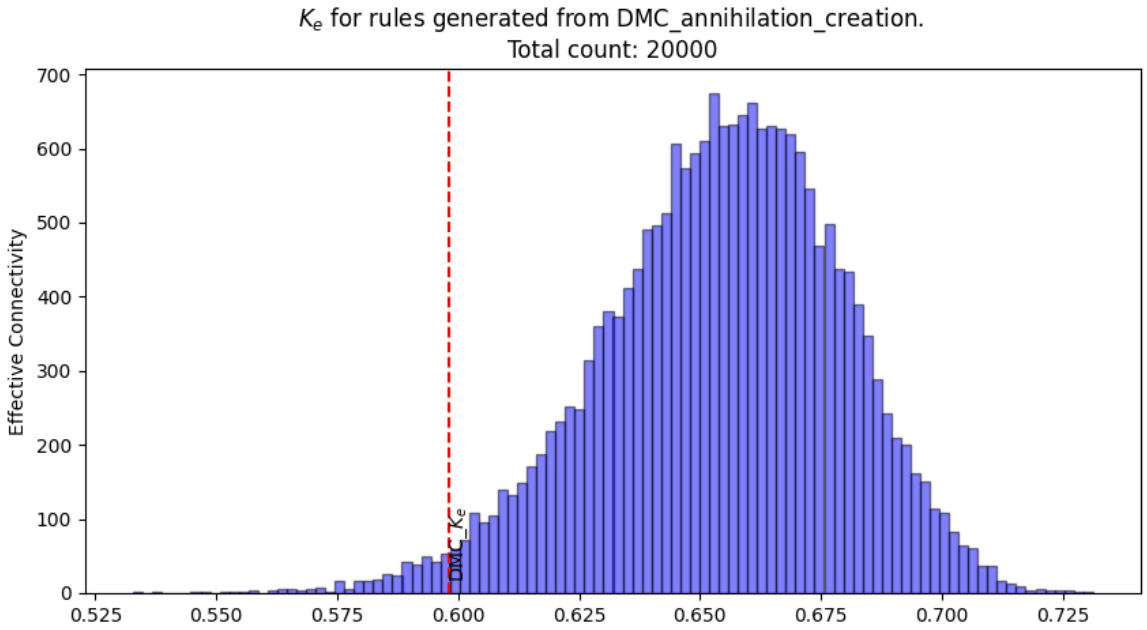


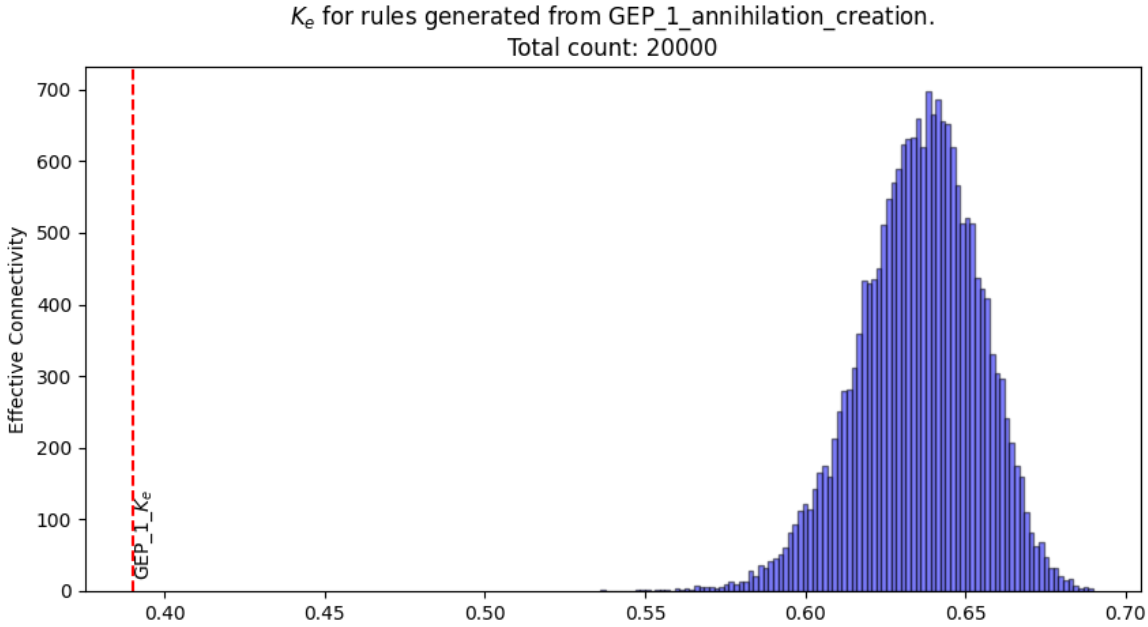

K_e for rules generated from COE_1_annihilation_creation.
Total count: 20000
Effective Connectivity
COE_1 K_e
0
100
200
300
400
500
600
700
0.55
0.60
0.65
0.70
0.75

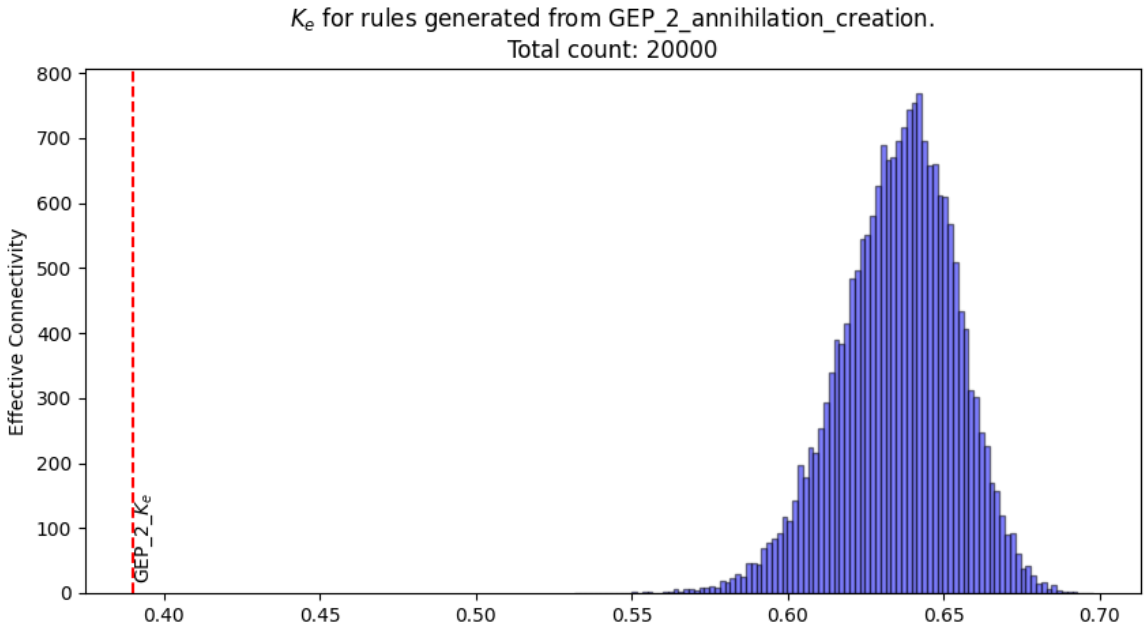

K_e for rules generated from COE_2_annihilation_creation.
Total count: 20000
Effective Connectivity
COE_2 K_e
0
100
200
300
400
500
600
700
0.525
0.550
0.575
0.600
0.625
0.650
0.675
0.700

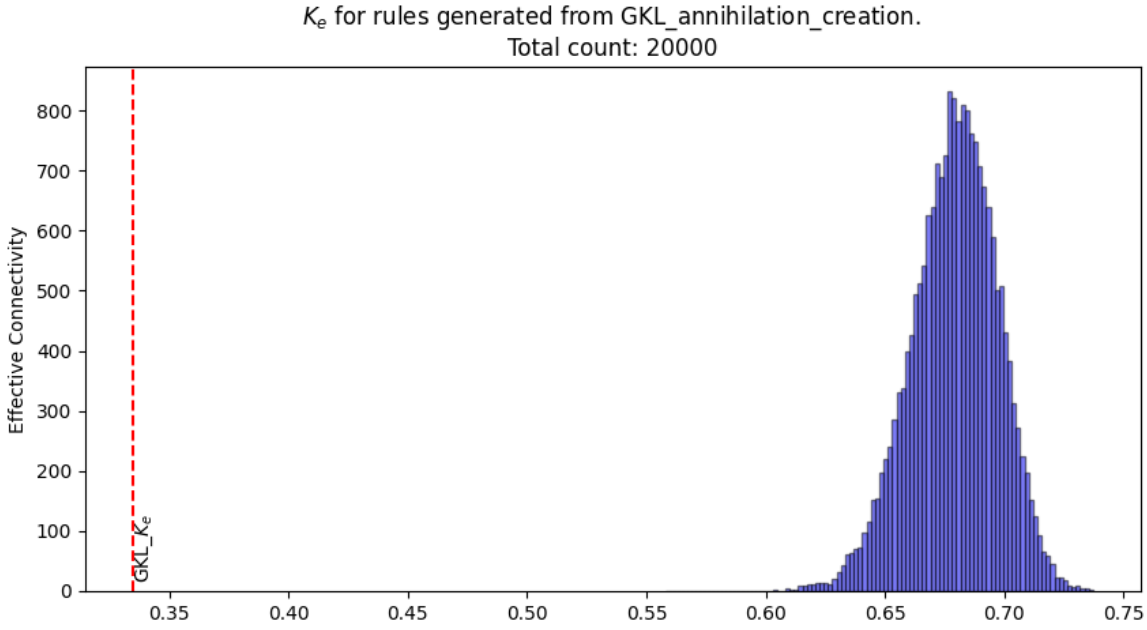

K_e for rules generated from Das_annihilation_creation.
Total count: 20000
Effective Connectivity
Das_K_e
0
100
200
300
400
500
600
700
0.40
0.45
0.50
0.55
0.60
0.65

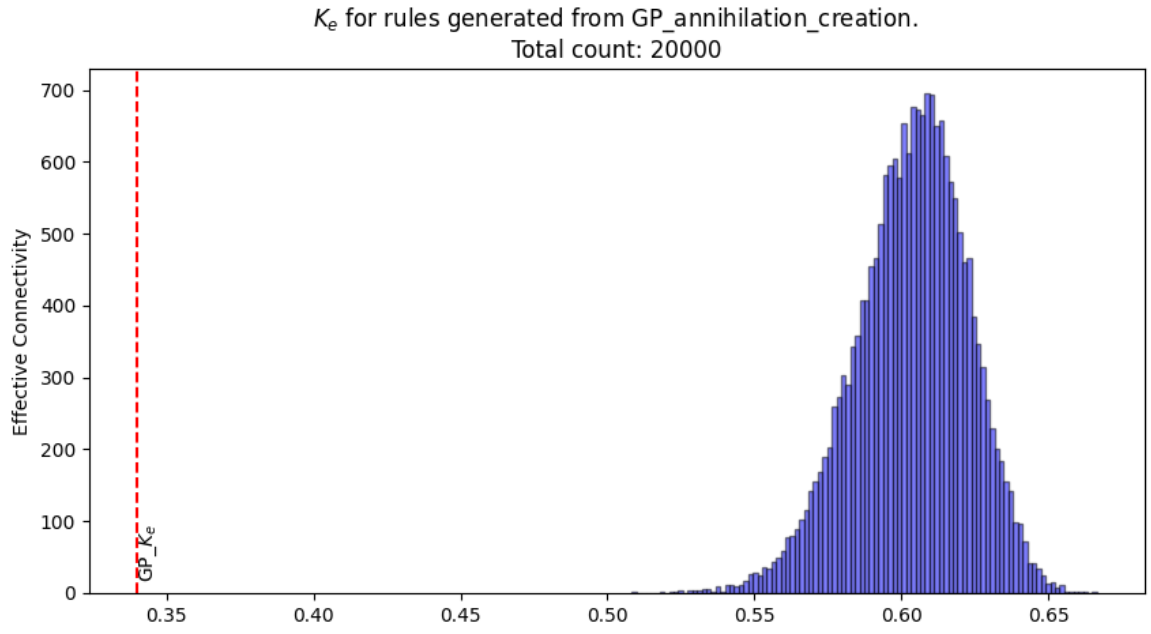

K_e for rules generated from Davis_annihilation_creation.
Total count: 20000
Effective Connectivity
Davis_K_e
0
100
200
300
400
500
600
700
0.50
0.55
0.60
0.65
0.70
0.75

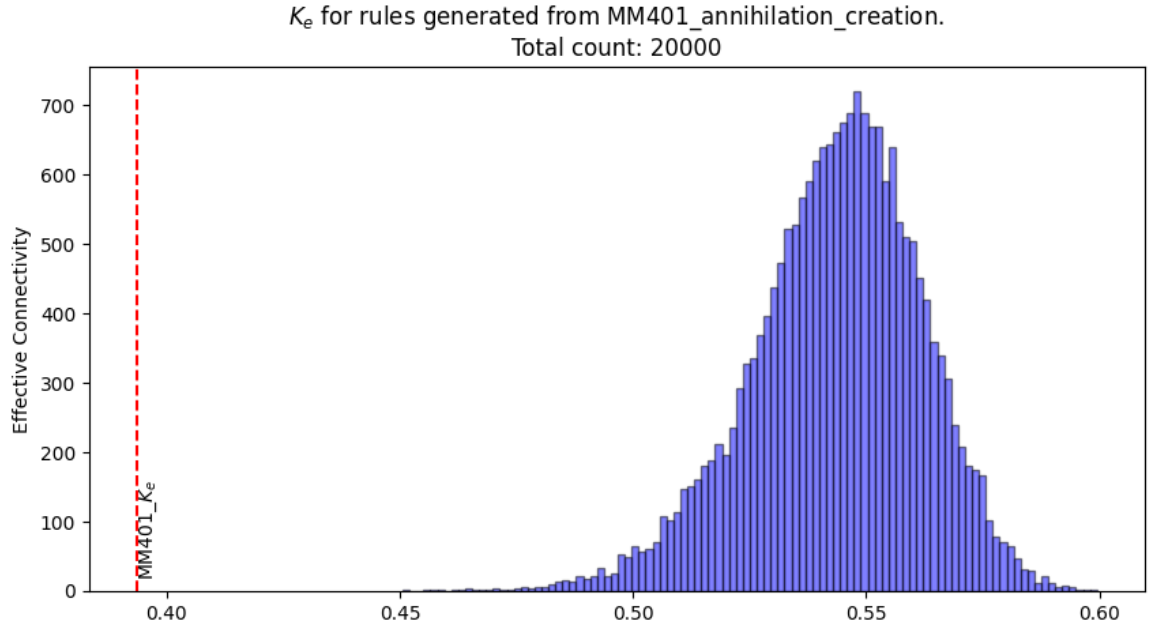

K_e for rules generated from DMC_annihilation_creation.
Total count: 20000
Effective Connectivity
DMC_K_e
0
100
200
300
400
500
600
700
0.525
0.550
0.575
0.600
0.625
0.650
0.675
0.700
0.725


K_e for rules generated from GEP_1_annihilation_creation.
Total count: 20000
Effective Connectivity
GEP_1_K_e
0
100
200
300
400
500
600
700
0.40
0.45
0.50
0.55
0.60
0.65
0.70


K_e for rules generated from GEP_2_annihilation_creation.
Total count: 20000
Effective Connectivity
GEP_2 K_e
0
100
200
300
400
500
600
700
800
0.40
0.45
0.50
0.55
0.60
0.65
0.70


K_e for rules generated from GKL_annihilation_creation.
Total count: 20000
Effective Connectivity
GKL K_e
0
100
200
300
400
500
600
700
800
0.35
0.40
0.45
0.50
0.55
0.60
0.65
0.70
0.75

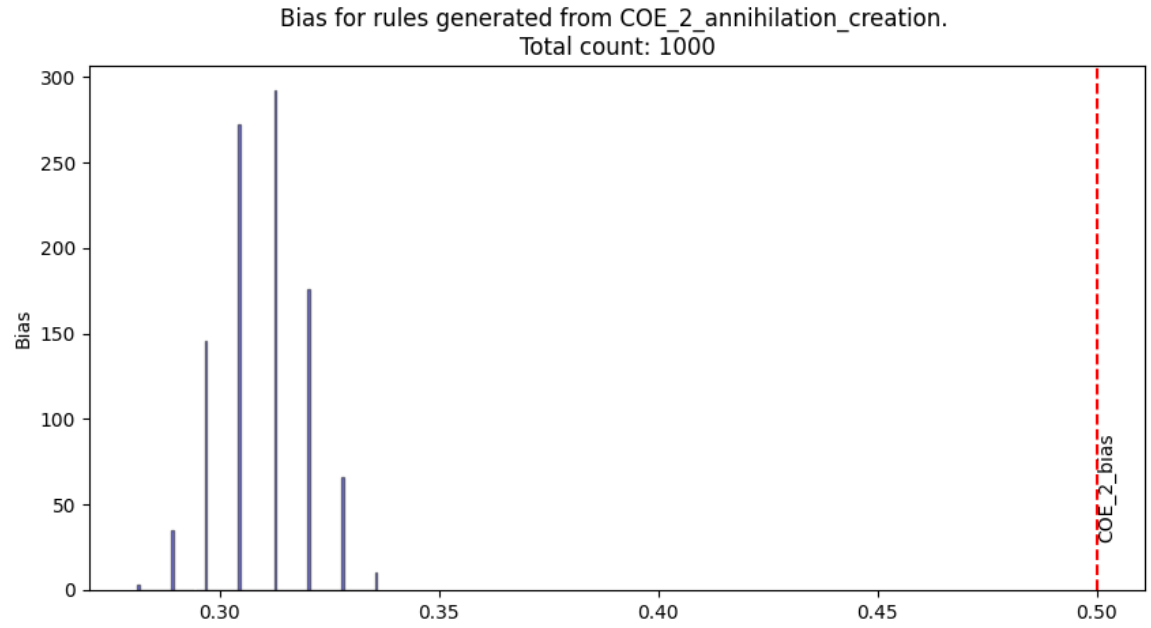


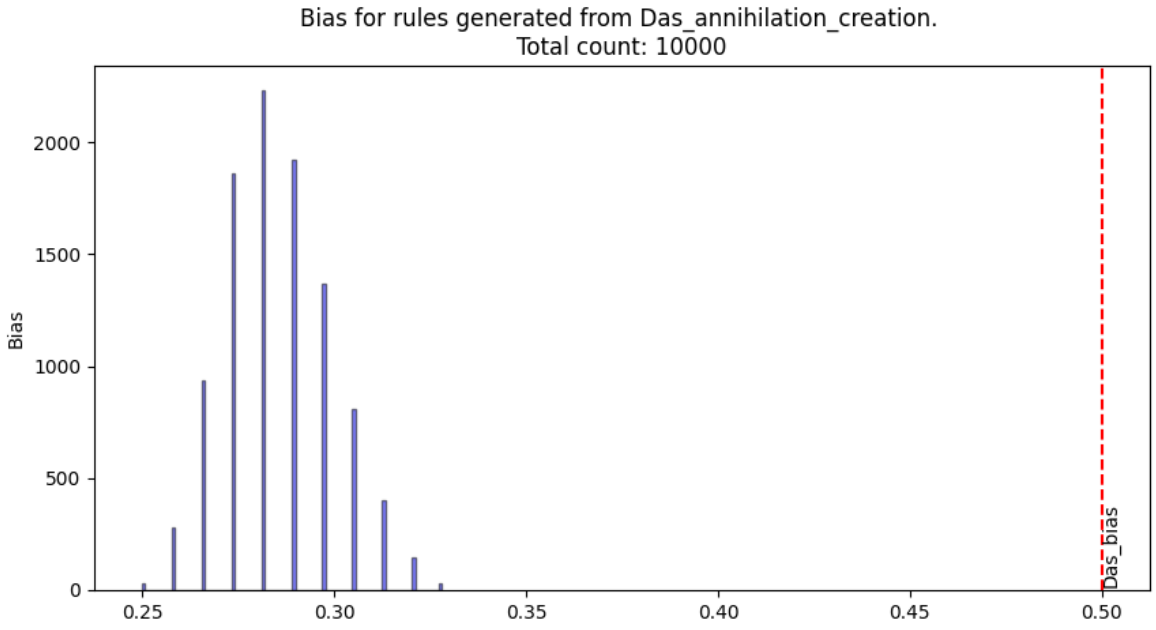


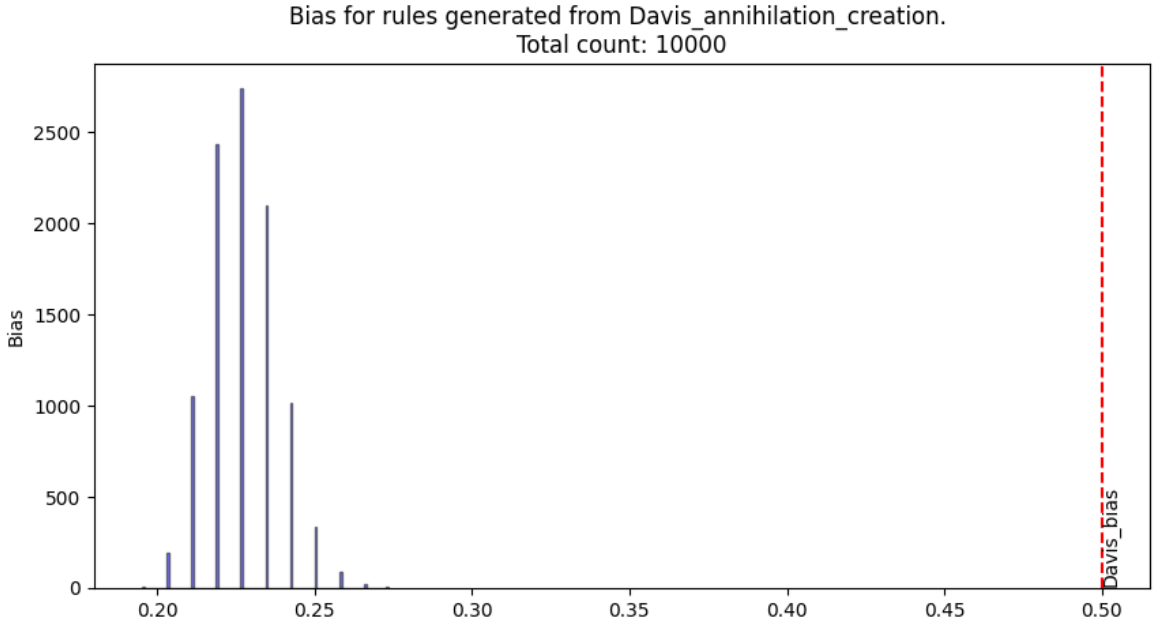
COE_1 K_e is easier to replicate via annihilation generation when generated with the parent rule bias. The rest, not so much.

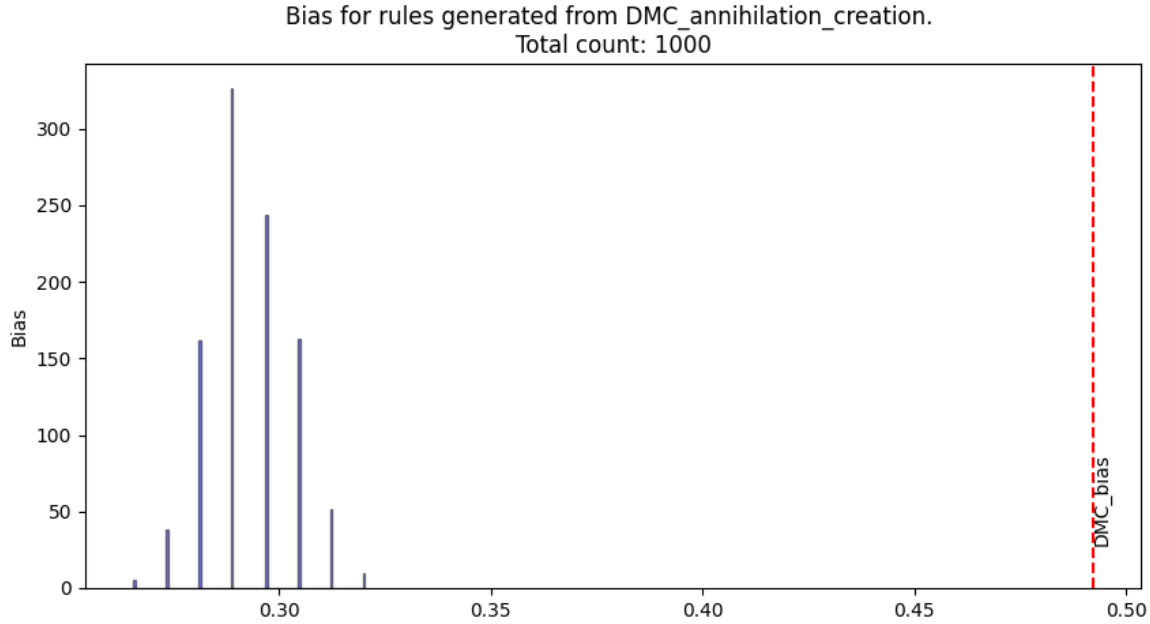
Bias of rules generated with parent rule K_e

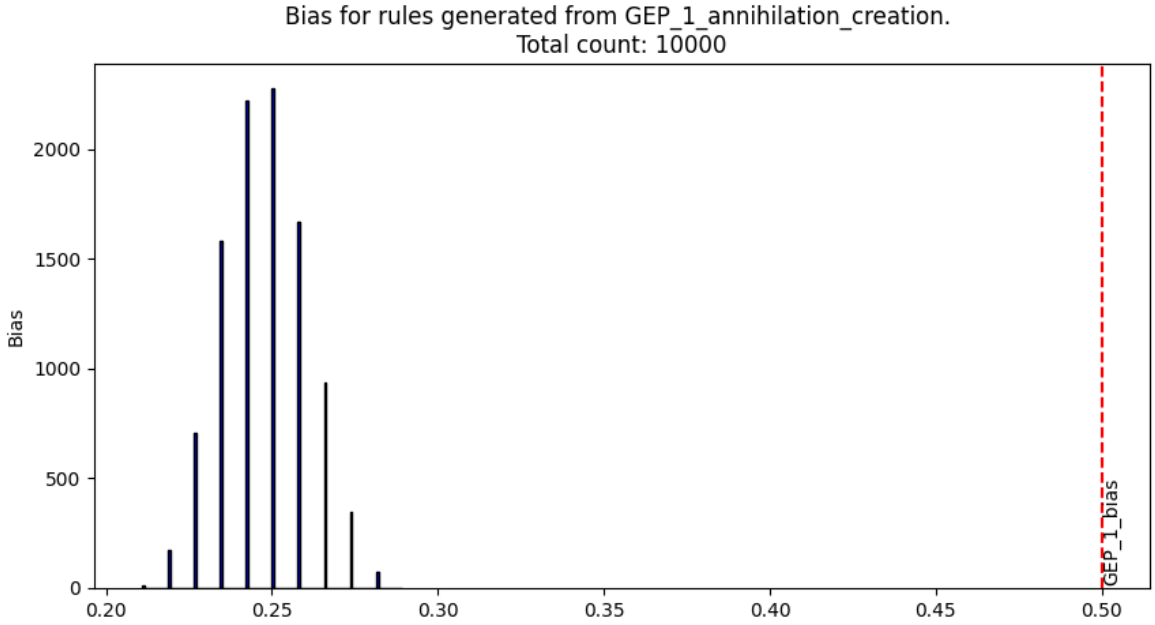
Below are the histograms of the bias of new rules generated with the parent rule K_e.

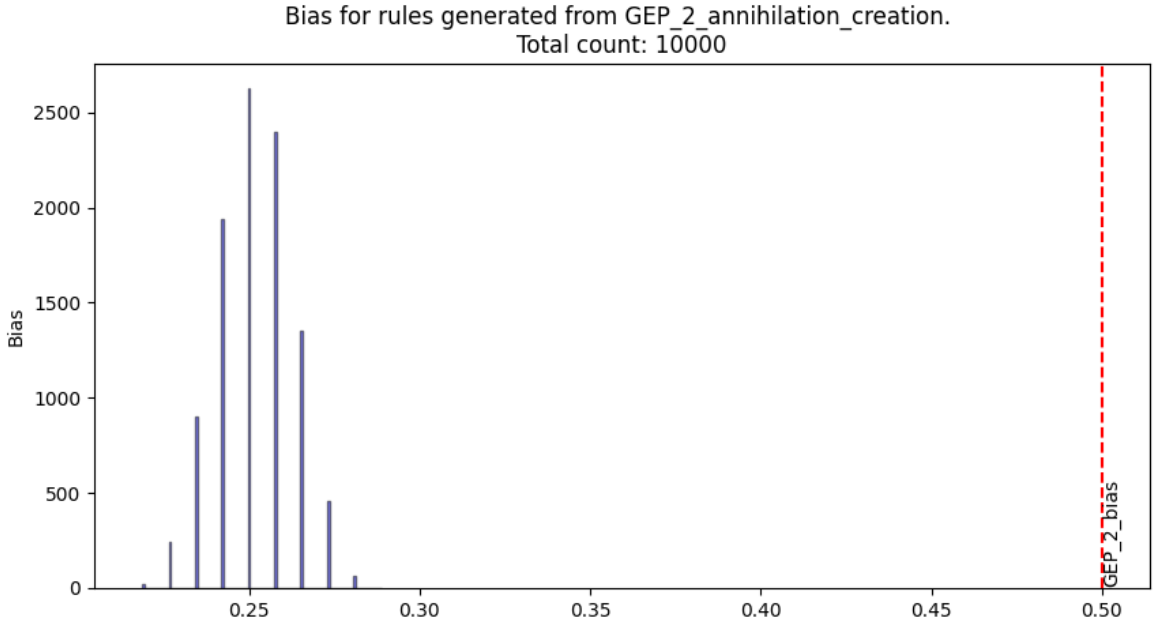


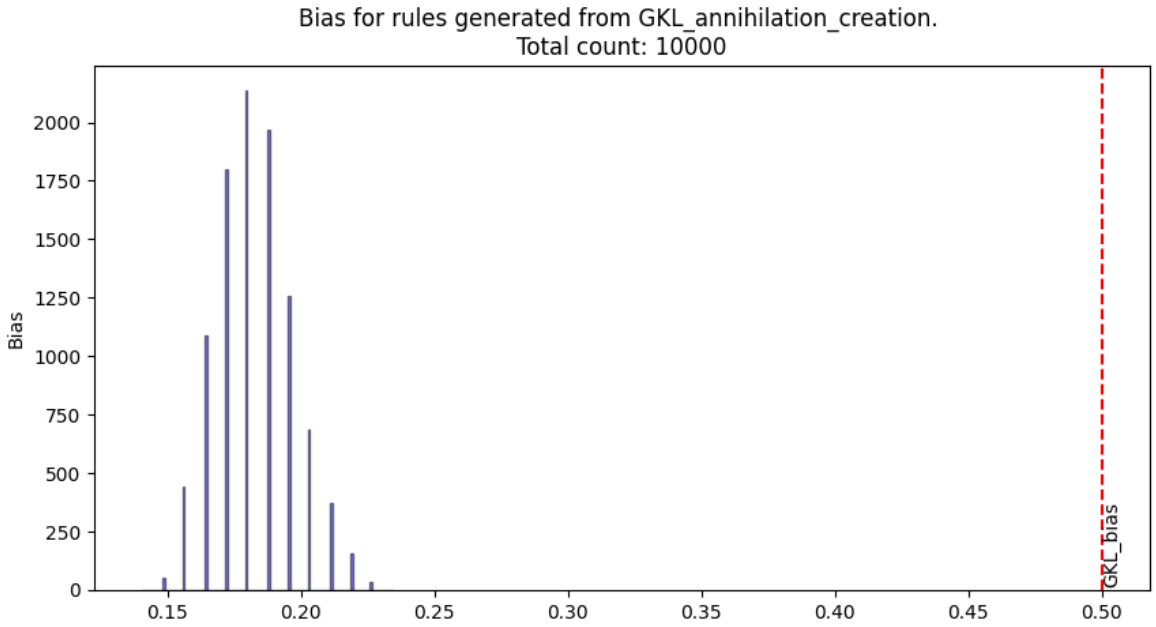


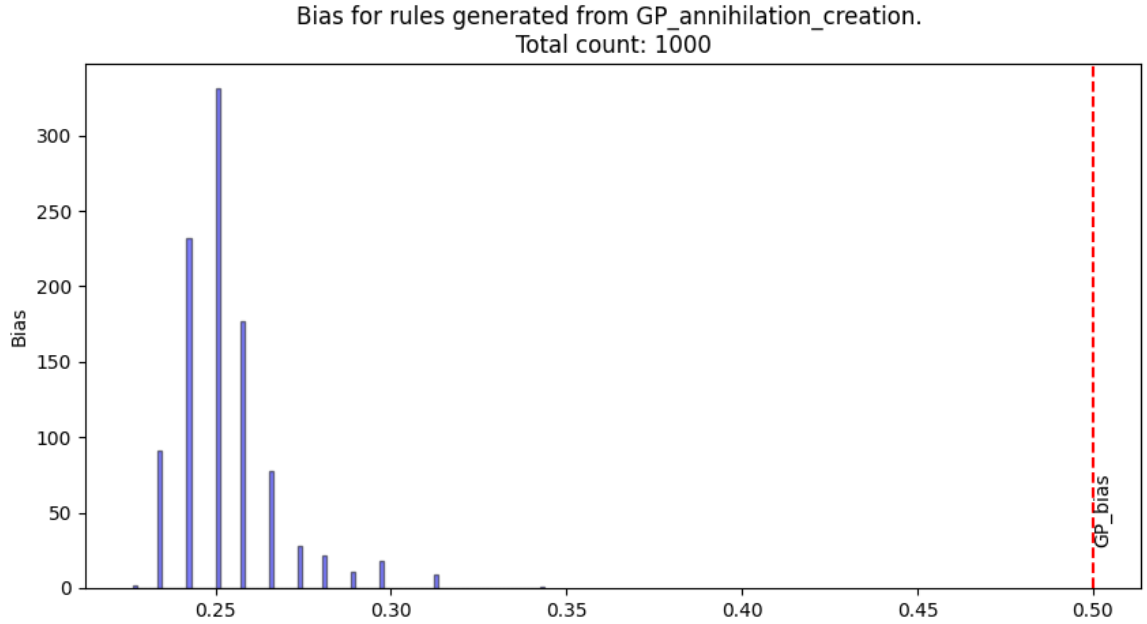

Bias for rules generated from Davis_annihilation_creation.
Total count: 10000
Bias
2500
2000
1500
1000
500
0
0.20
0.25
0.30
0.35
0.40
0.45
0.50
Davis_bias

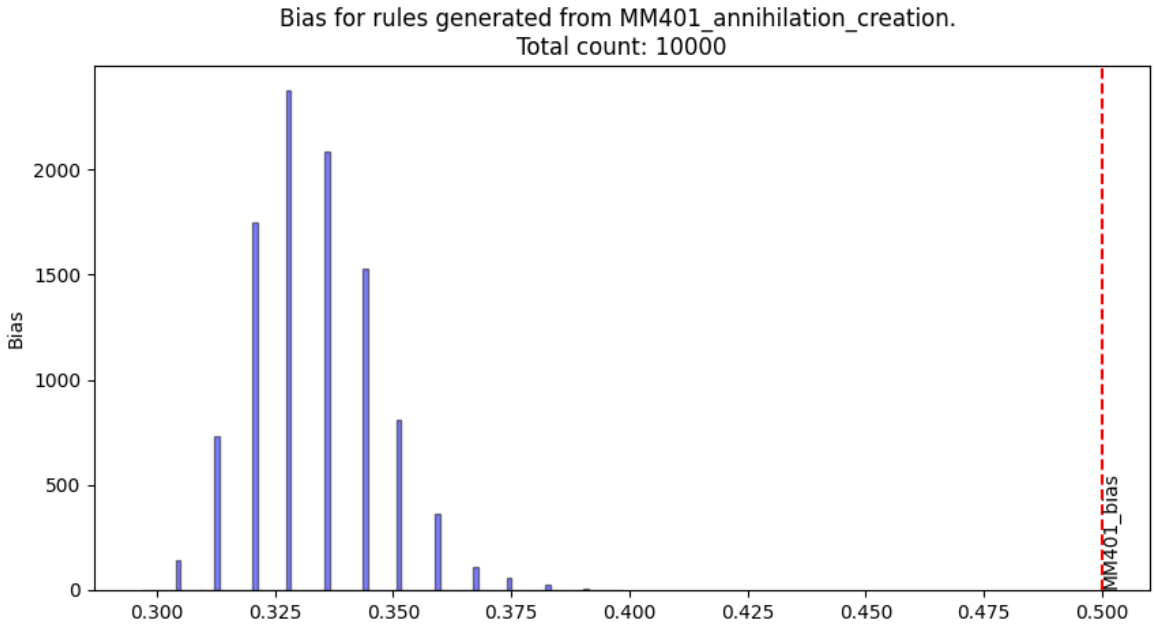

Bias for rules generated from DMC_annihilation_creation.
Total count: 1000
Bias
300
250
200
150
100
50
0
0.30
0.35
0.40
0.45
0.50
DMC_bias


Bias for rules generated from GEP_1_annihilation_creation.
Total count: 10000
Bias
2000
1500
1000
500
0
0.20
0.25
0.30
0.35
0.40
0.45
0.50
GEP_1_bias


Bias for rules generated from GEP_2_annihilation_creation.
Total count: 10000
Bias
2500
2000
1500
1000
500
0
0.25
0.30
0.35
0.40
0.45
0.50
GEP_2_bias


Bias for rules generated from GKL_annihilation_creation.
Total count: 10000
Bias
GKL_bias
0
250
500
750
1000
1250
1500
1750
2000
0.15
0.20
0.25
0.30
0.35
0.40
0.45
0.50


Bias for rules generated from GP_annihilation_creation.
Total count: 1000
Bias
GP_bias
0
50
100
150
200
250
300
0.25
0.30
0.35
0.40
0.45
0.50



Randomly sampled across the permutation space, the bias of generated rules are far away from the bias of the parent rule when generated from the parent rule K_e.