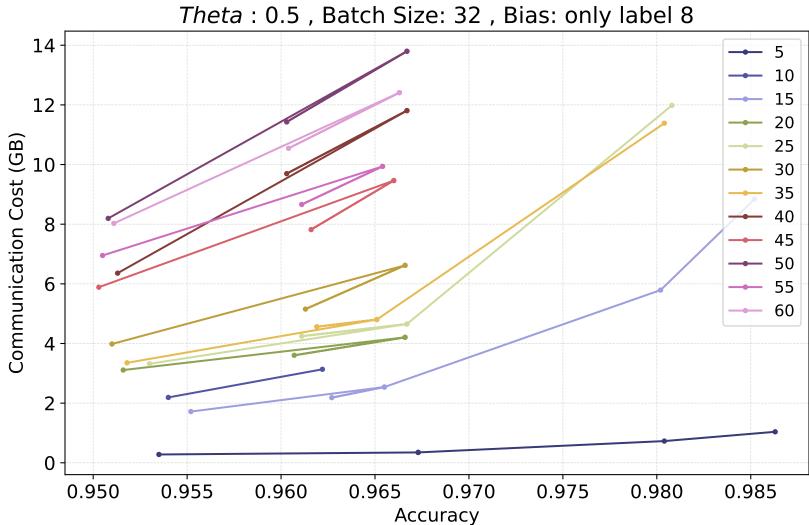
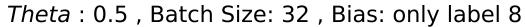
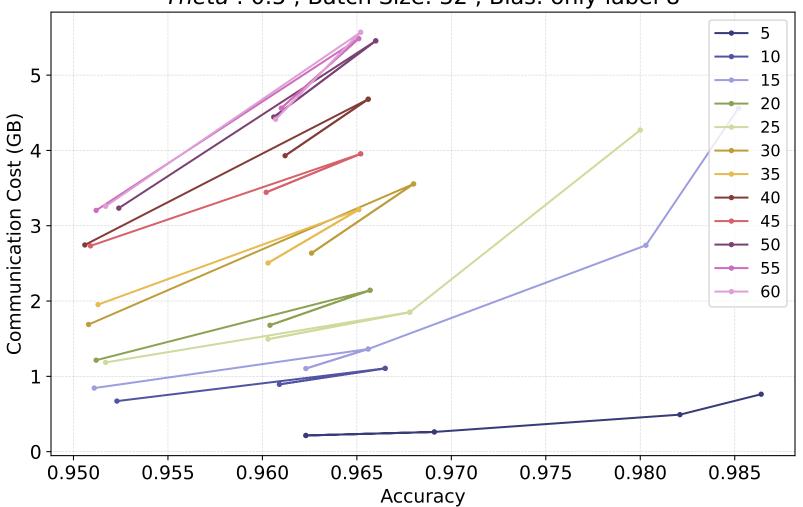


gm

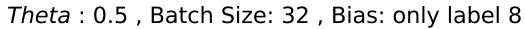


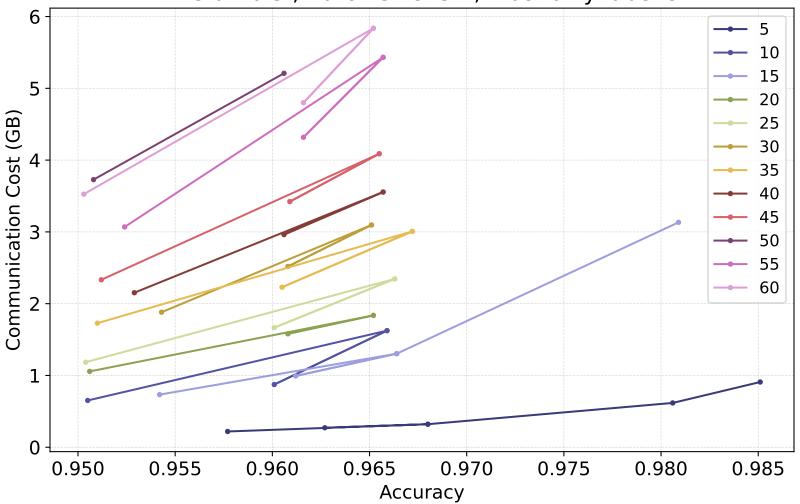
naive



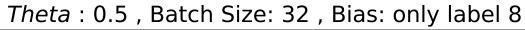


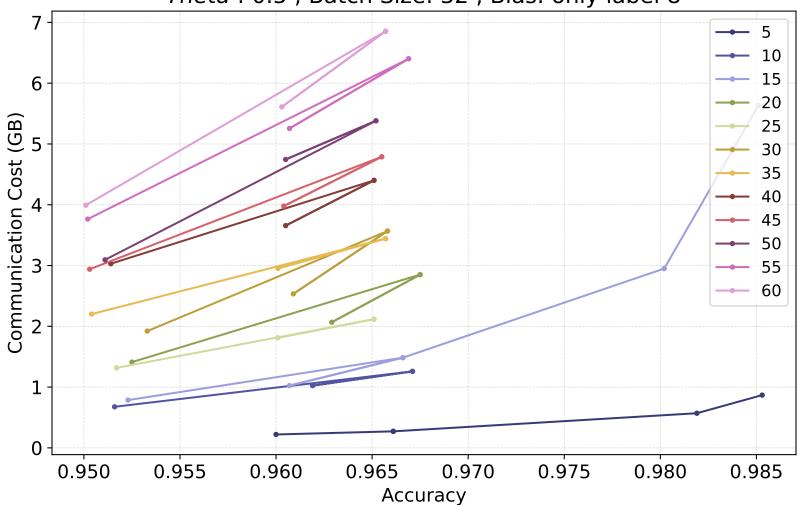
linear



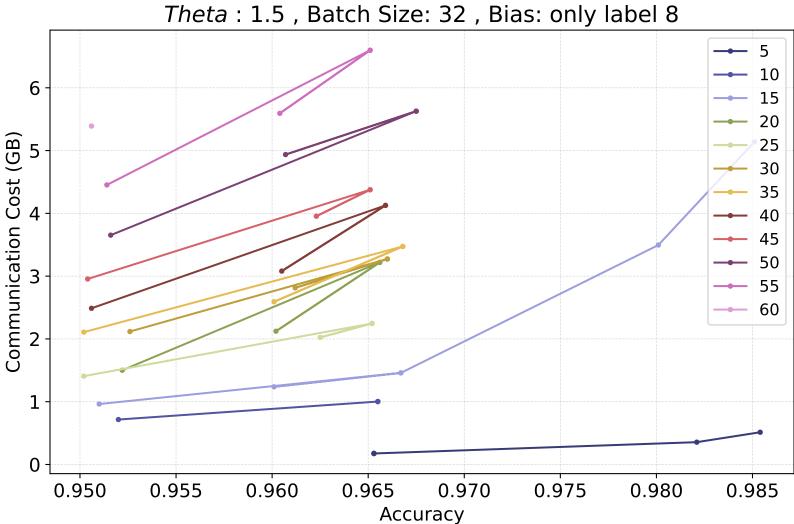


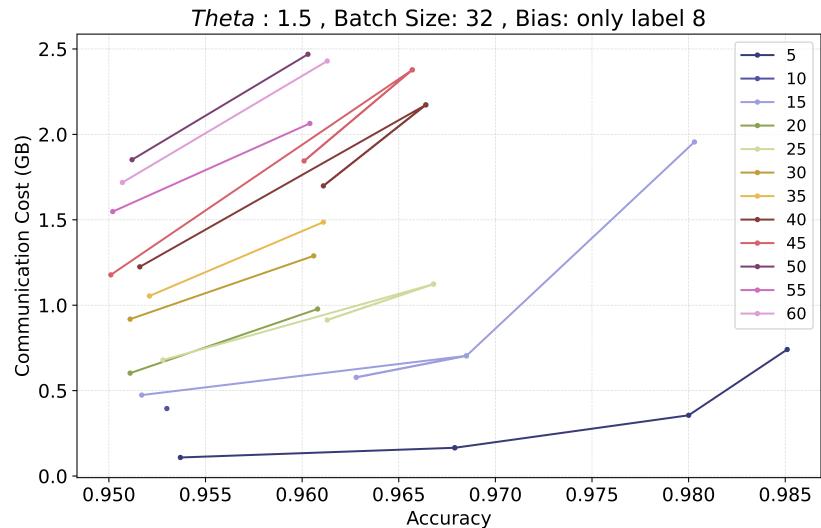
sketch



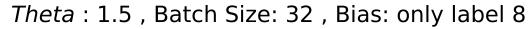


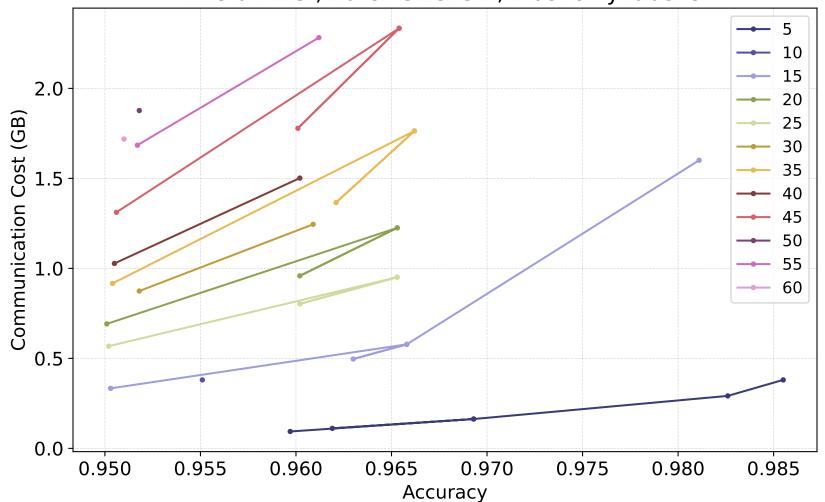
gm *Theta*: 1.5, Batch Size:





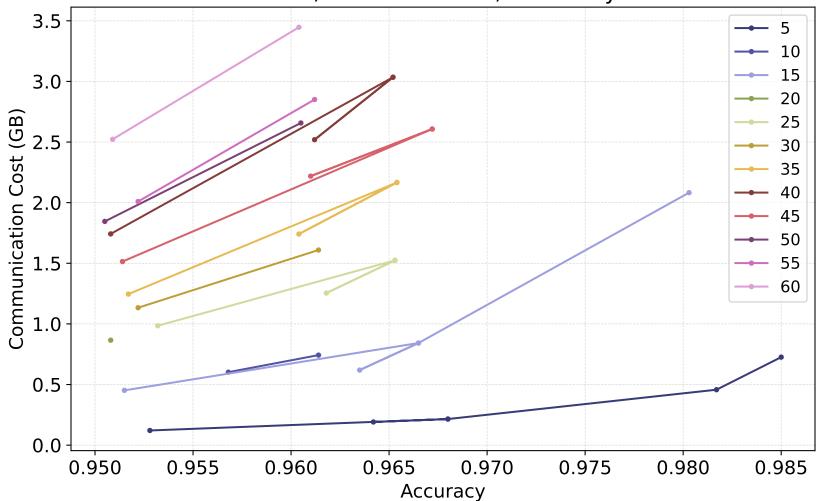
linear



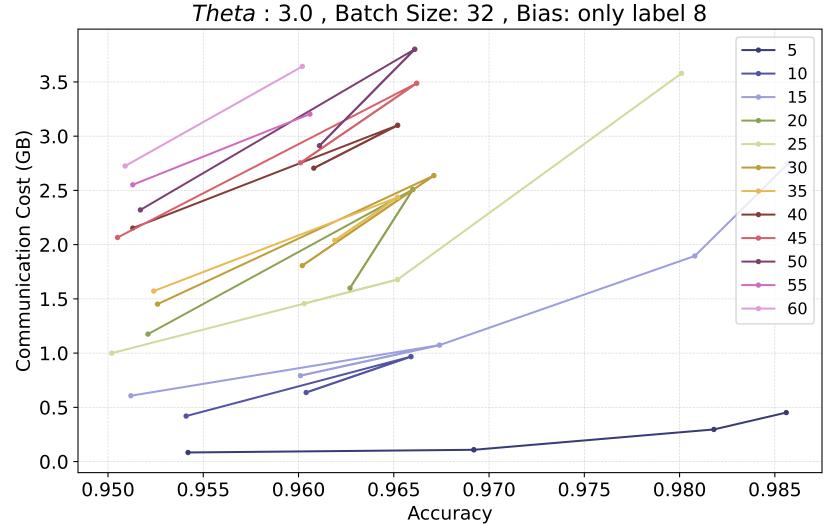


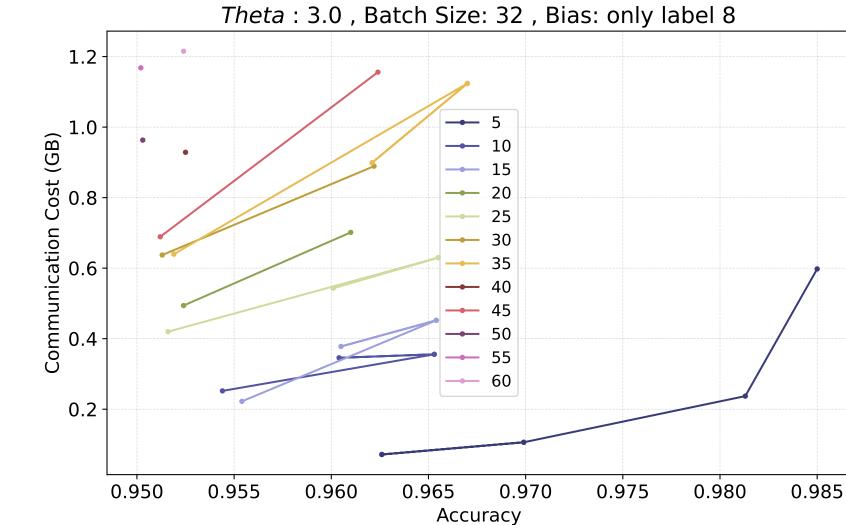
sketch

Theta: 1.5, Batch Size: 32, Bias: only label 8

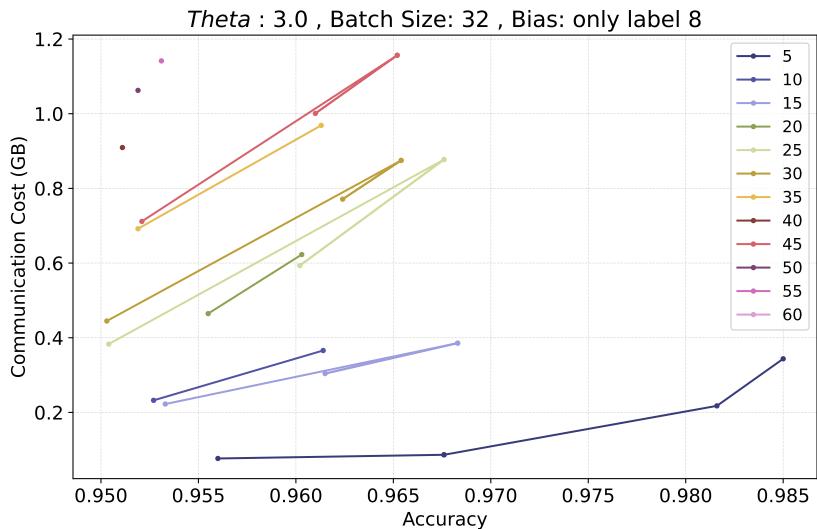


gm

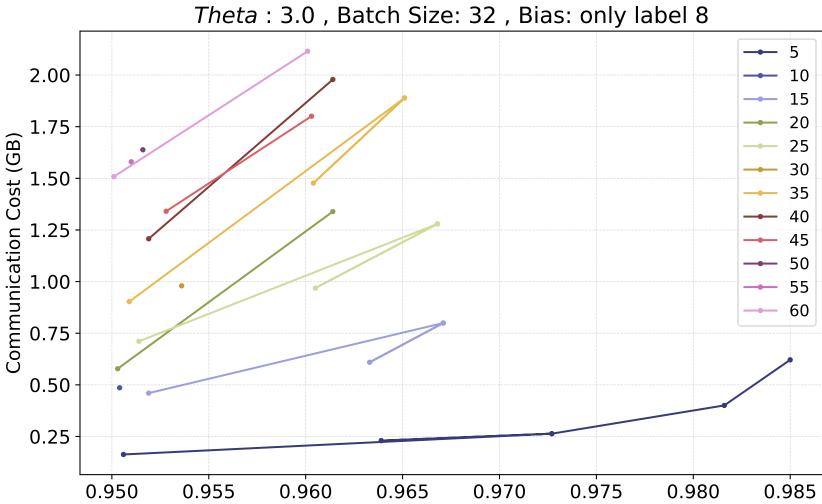




linear

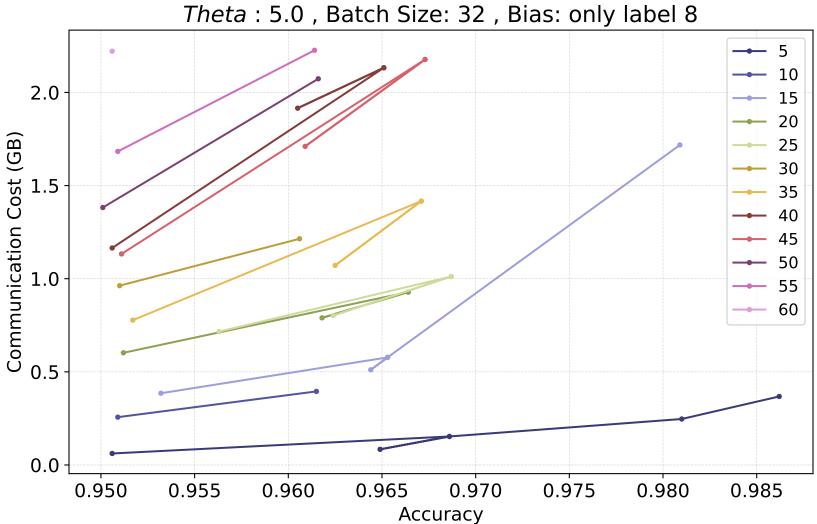


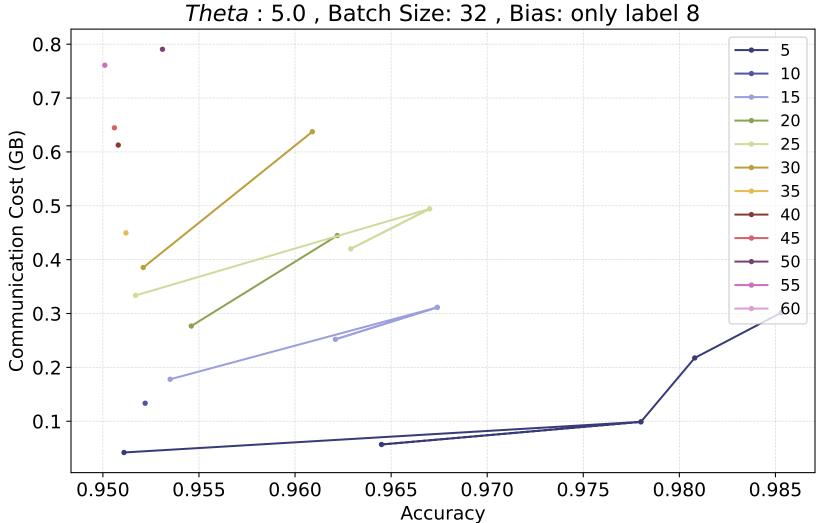
sketch



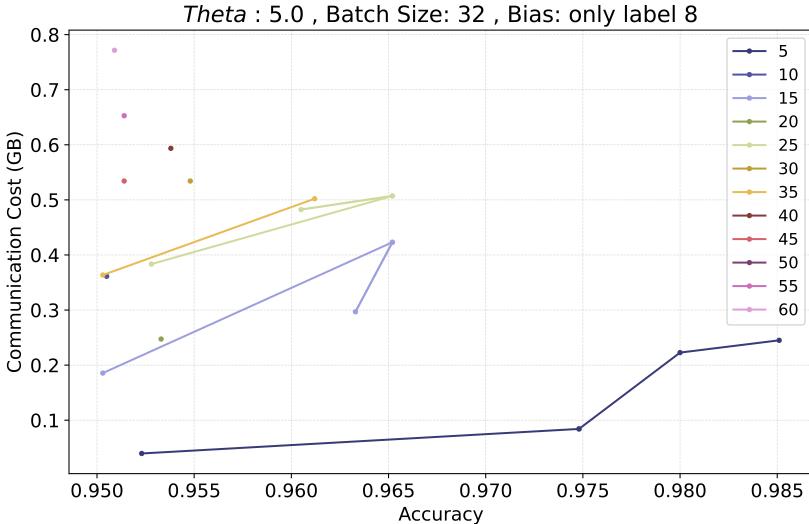
Accuracy

gm *Theta* : 5.0 , Batch Size:

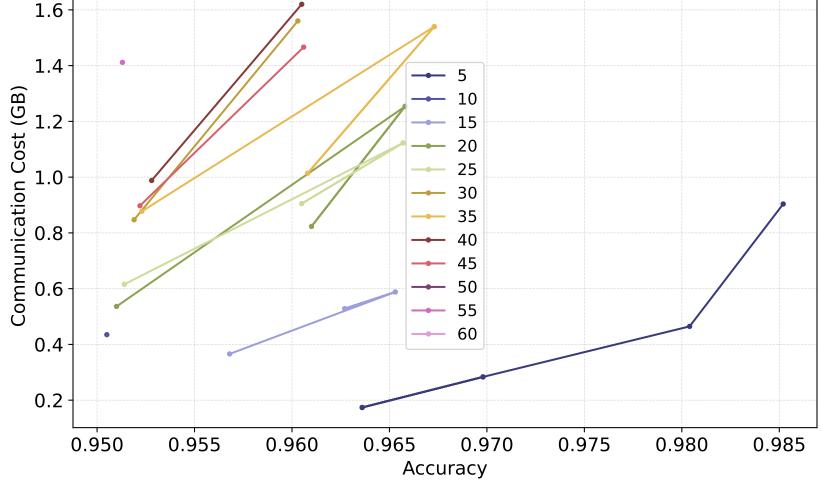




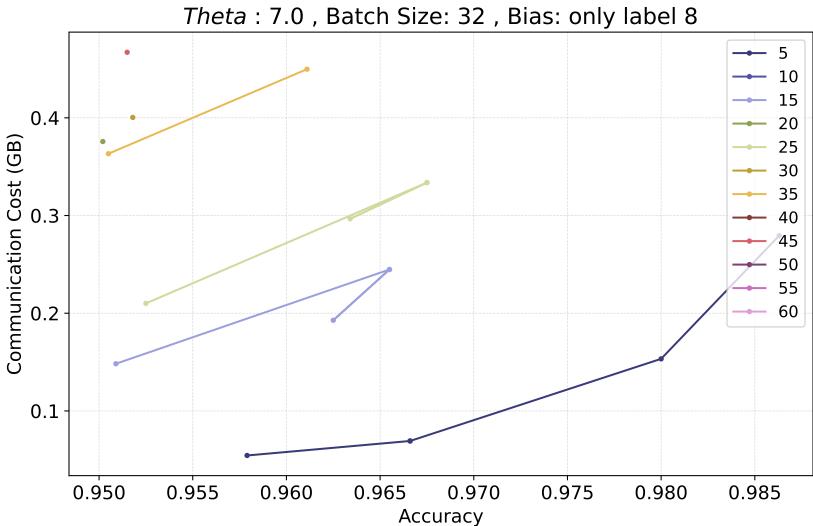
linear



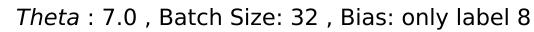
sketch Theta: 5.0, Batch Size: 32, Bias: only label 8

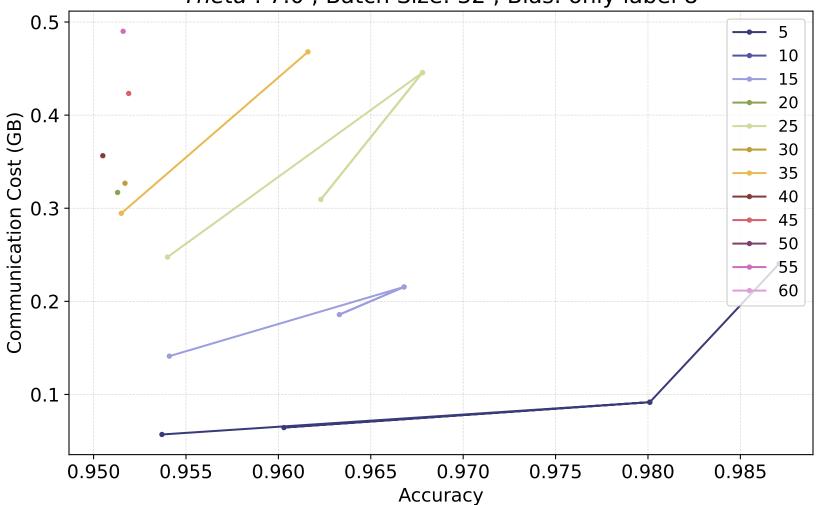


gm Theta: 7.0, Batch Size: 32, Bias: only label 8 1.4 10 1.2 15 20 Communication Cost (GB) 25 1.0 30 35 40 8.0 45 50 0.6 55 **—** 60 0.4 0.2 0.0 0.950 0.955 0.960 0.970 0.975 0.980 0.985 0.965 Accuracy

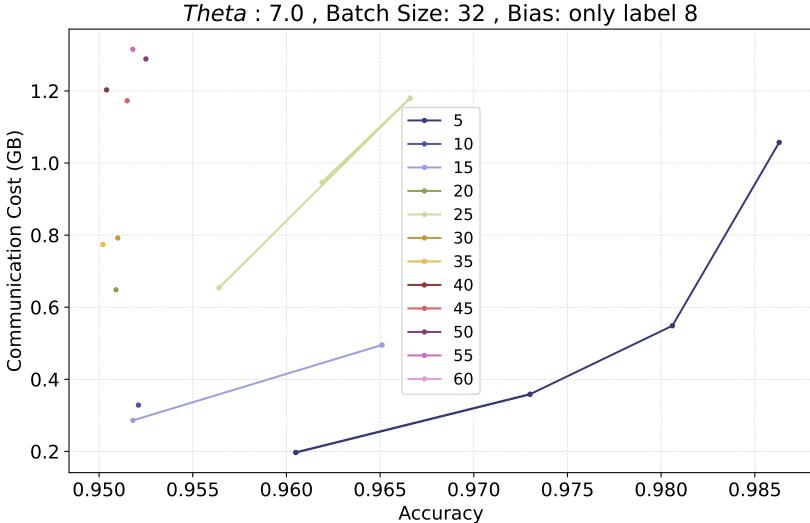


linear

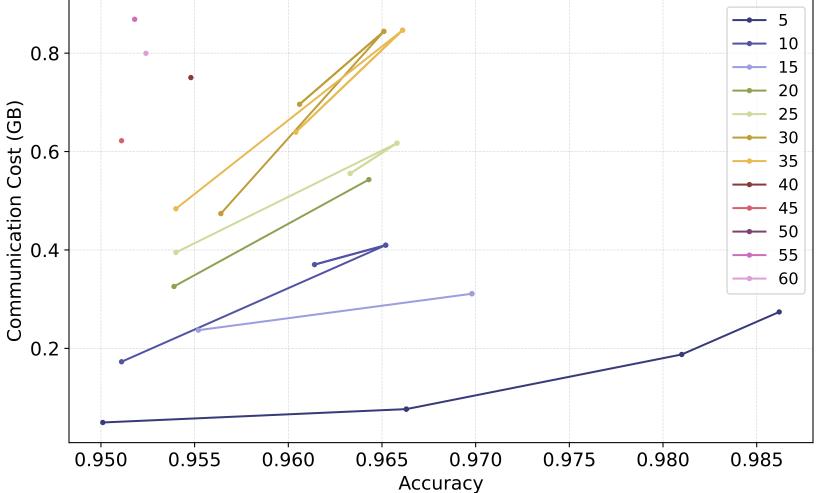




sketch

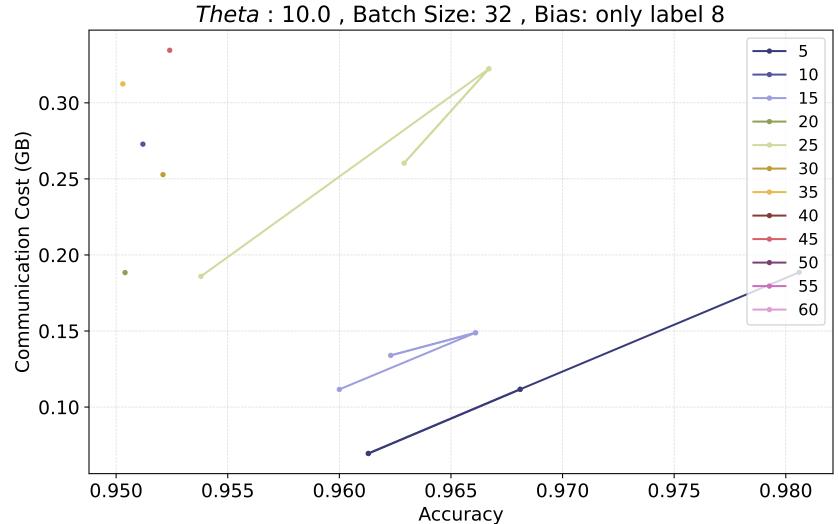


gm Theta: 10.0, Batch Size: 32, Bias: only label 8 8.0



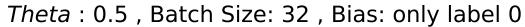
naive Theta: 10.0, Batch Size: 32, Bias: only label 8 10 0.30 20 Communication Cost (GB) 25 0.25 30 35 40 45 0.20 50 55 60 0.15 0.10 0.955 0.950 0.960 0.965 0.975 0.980 0.985 0.970 Accuracy

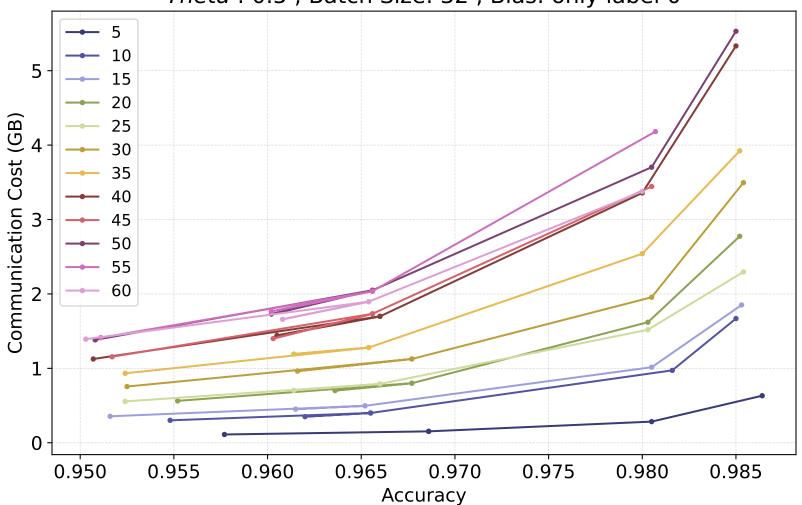
linear



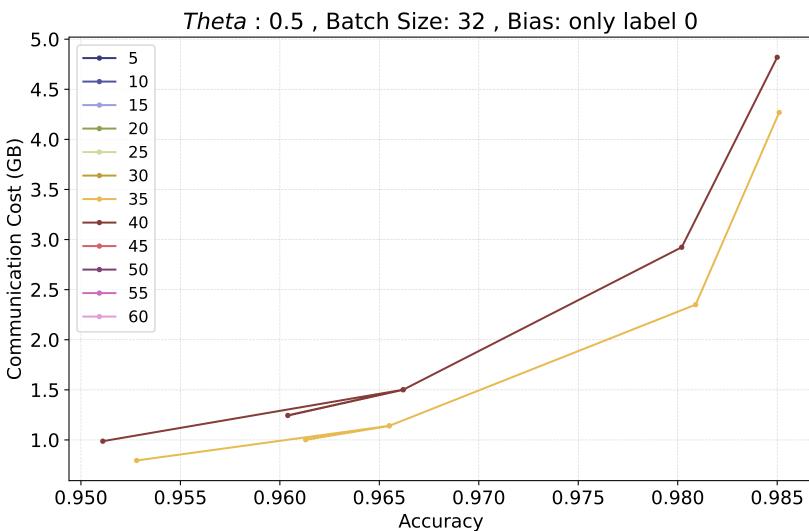
sketch Theta: 10.0, Batch Size: 32, Bias: only label 8 1.2 10 1.0 20 Communication Cost (GB) 25 30 35 40 45 50 55 60 0.2 0.950 0.955 0.960 0.975 0.980 0.965 0.970 Accuracy

naive

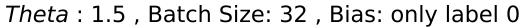


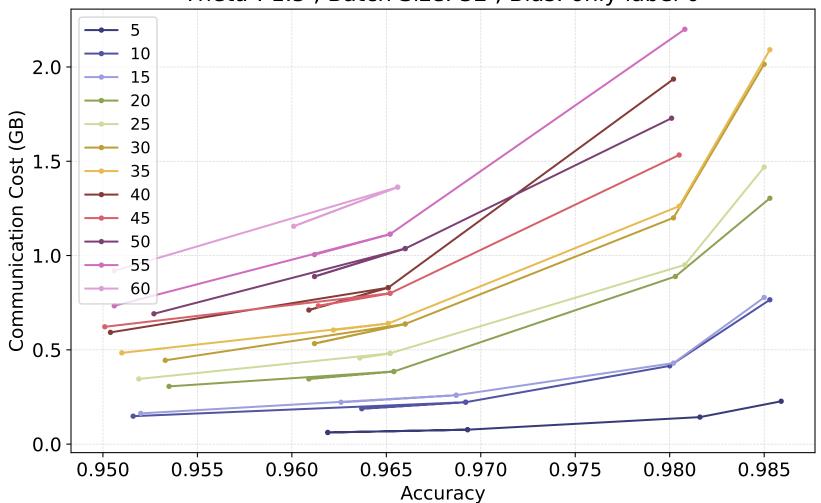


linear

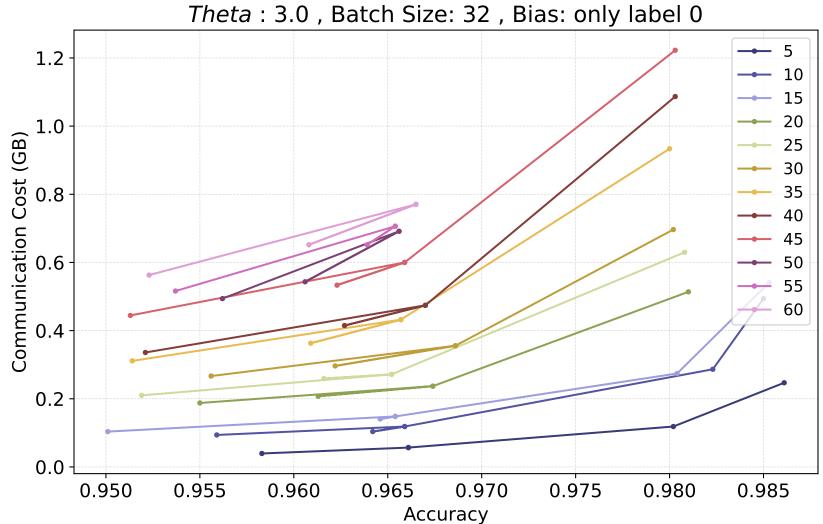


naive

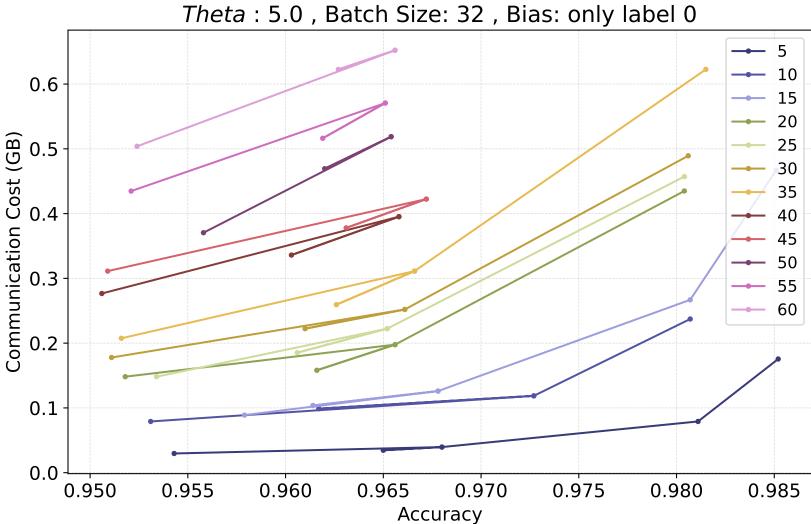




naive

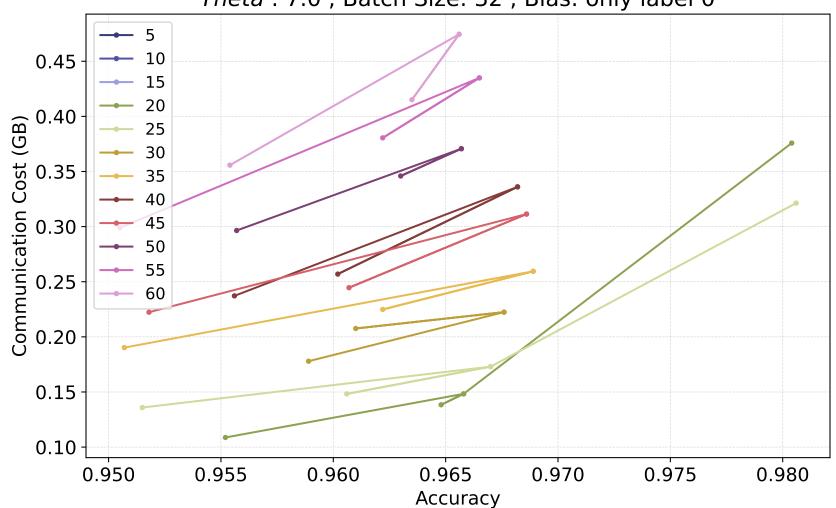


naive



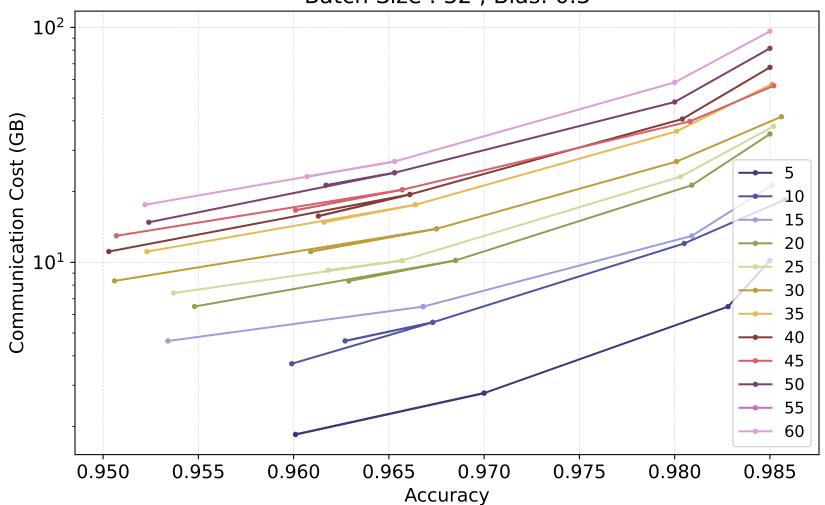
naive



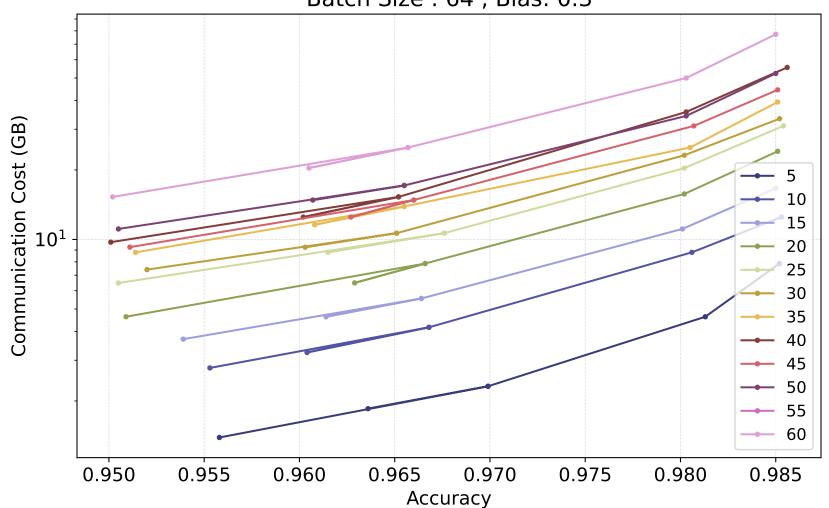


naive Theta: 10.0, Batch Size: 32, Bias: only label 0 0.40 10 0.35 20 Communication Cost (GB) 0.30 0.20 0.20 0.15 25 30 35 40 45 50 55 60 0.10 0.05 0.970 0.950 0.955 0.960 0.965 0.975 0.980 Accuracy

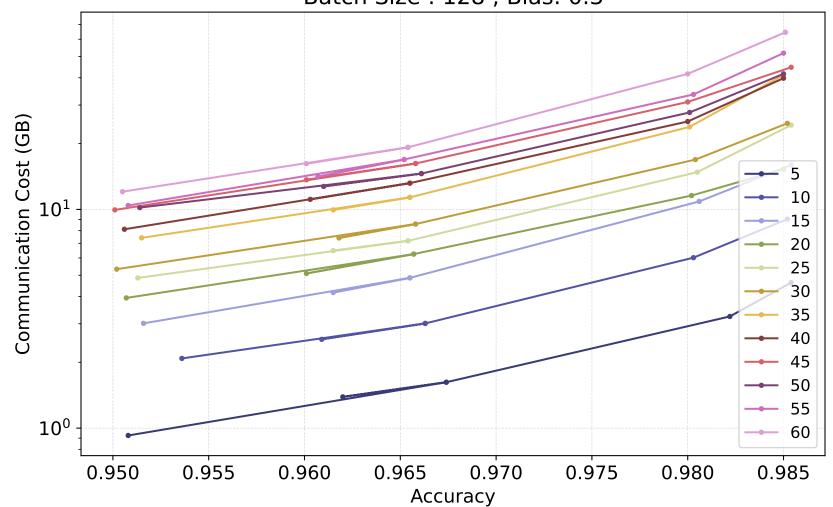
Batch Size: 32, Bias: 0.3



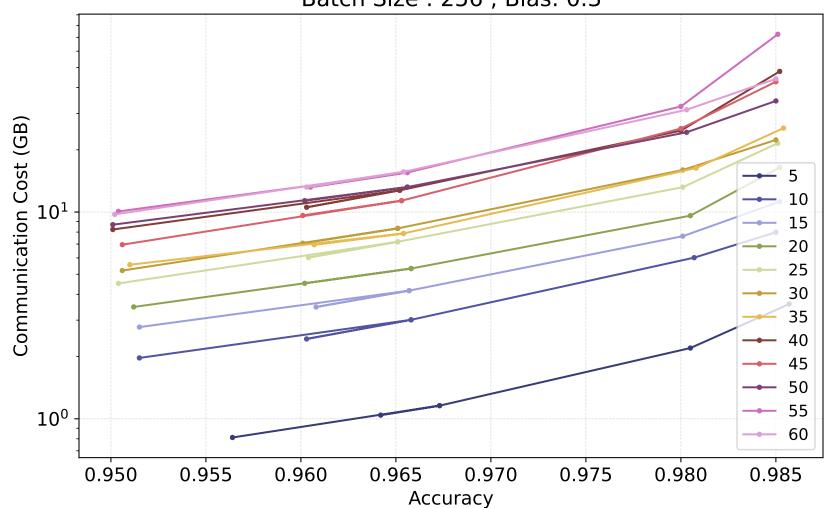
Batch Size: 64, Bias: 0.3

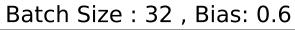


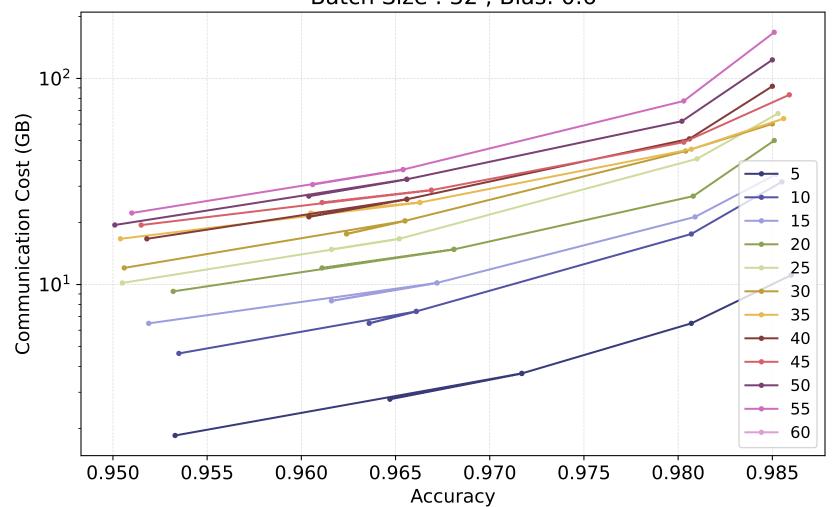




Batch Size: 256, Bias: 0.3

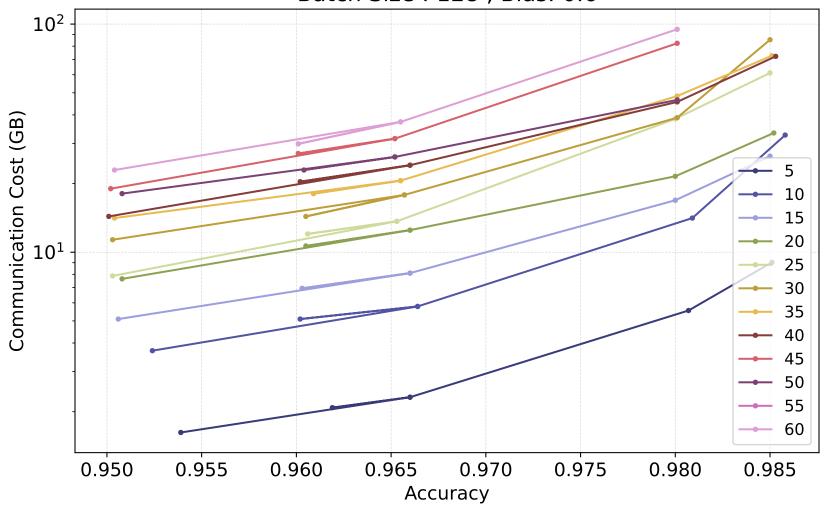




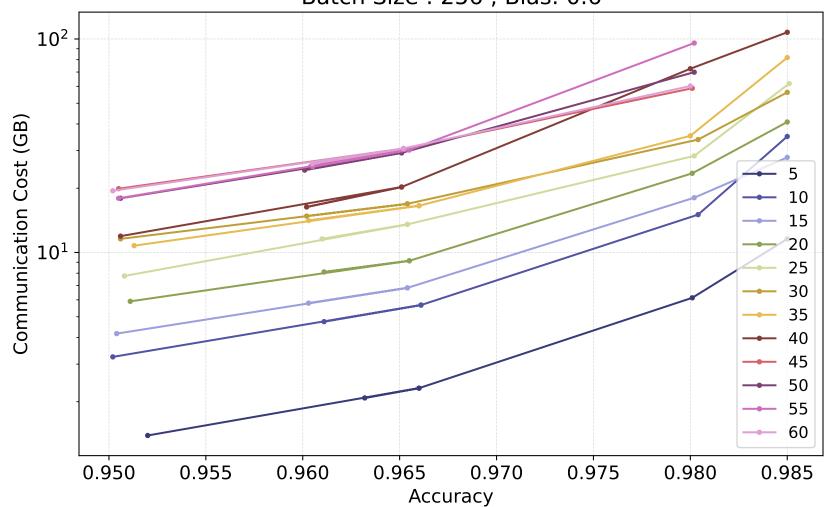


synchronous Batch Size: 64, Bias: 0.6 10² Communication Cost (GB) 10 15 20 10¹ 25 30 35 40 45 50 55 **60** 0.985 0.950 0.955 0.960 0.965 0.970 0.975 0.980 Accuracy



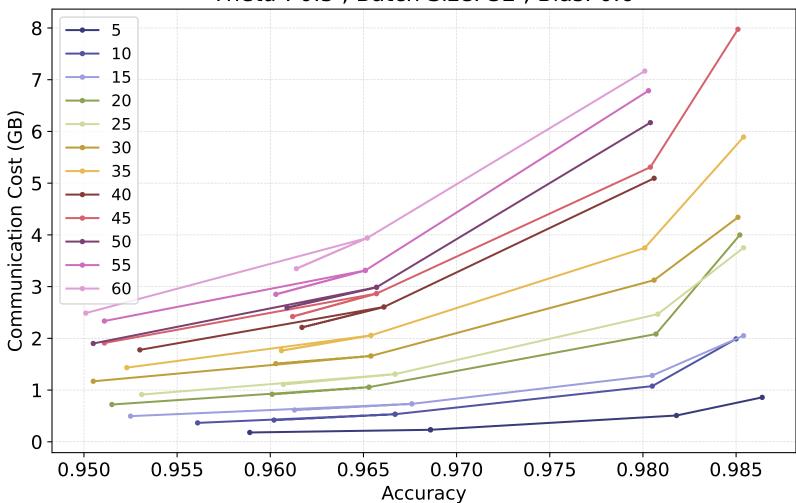


Batch Size: 256, Bias: 0.6



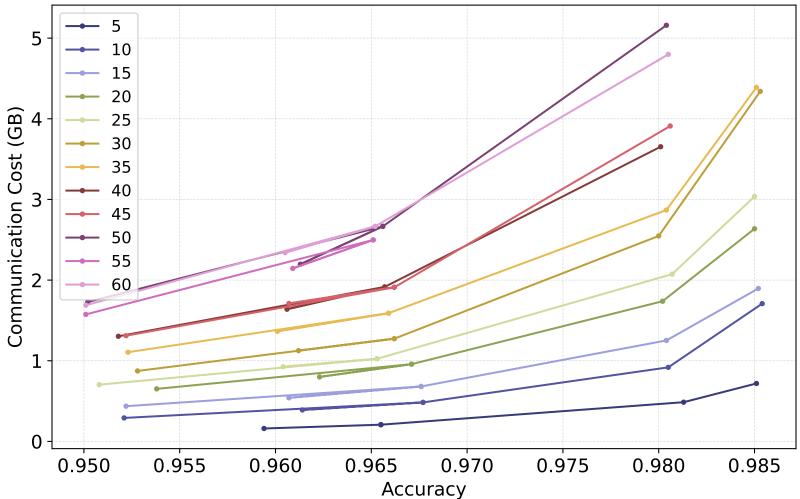
gm

Theta: 0.5, Batch Size: 32, Bias: 0.6



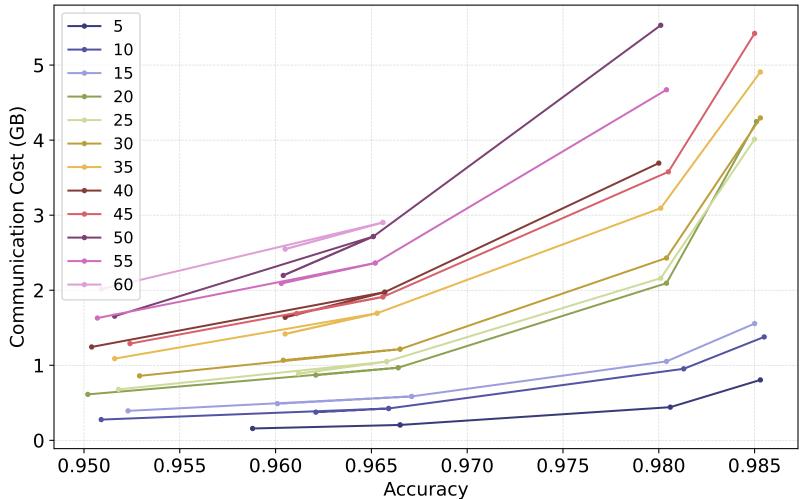
naive

Theta: 0.5, Batch Size: 32, Bias: 0.6

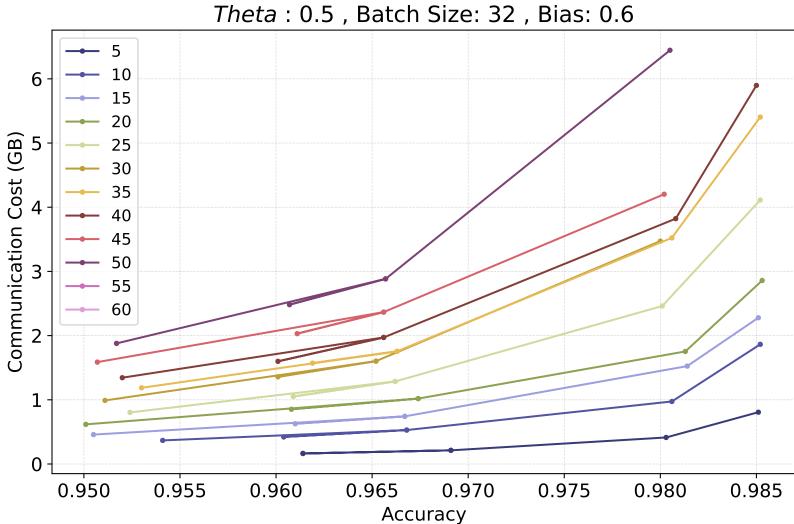


linear

Theta: 0.5, Batch Size: 32, Bias: 0.6

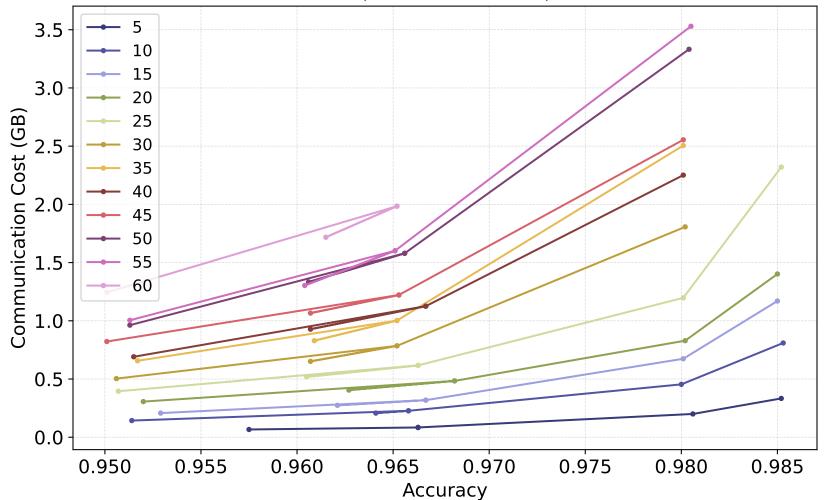


sketch

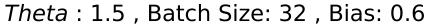


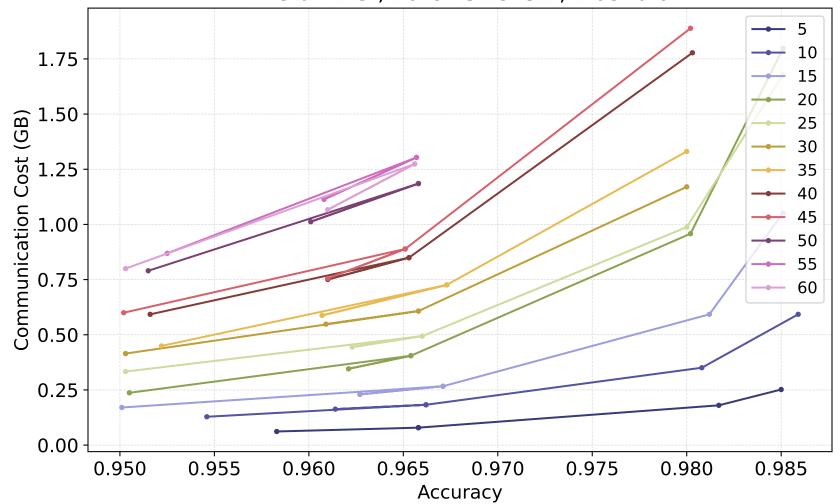
gm





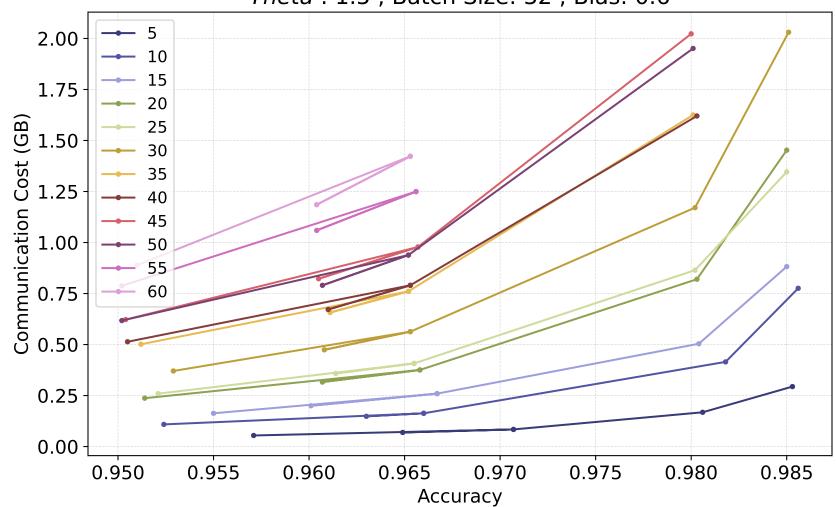
naive





linear

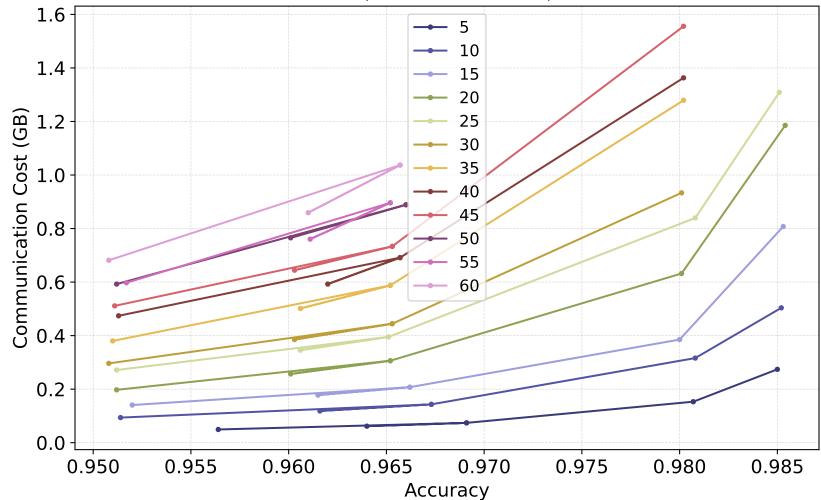
Theta: 1.5, Batch Size: 32, Bias: 0.6



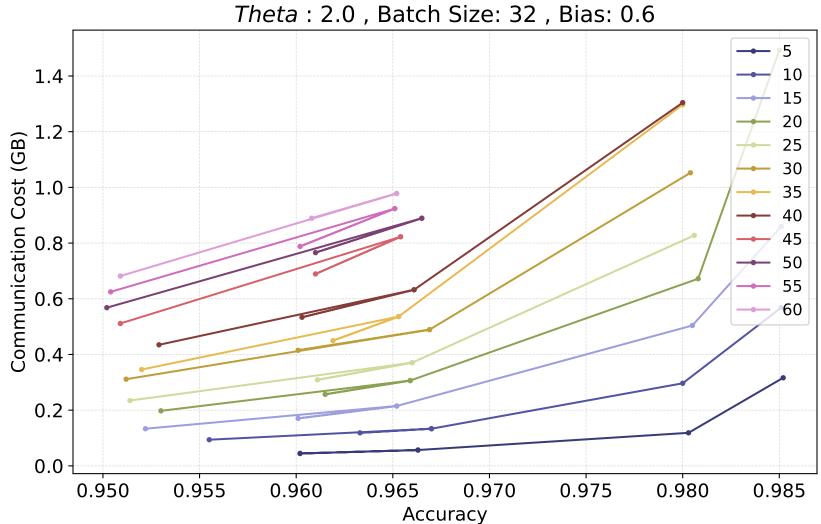
sketch Theta: 1.5, Batch Size: 32, Bias: 0.6 3.0 10 15 2.5 20 Communication Cost (GB) 1. 0. 0. 0. 25 30 2.0 35 40 45 1.5 50 55 60 0.5 0.0 0.955 0.960 0.965 0.980 0.985 0.950 0.970 0.975 Accuracy

naive

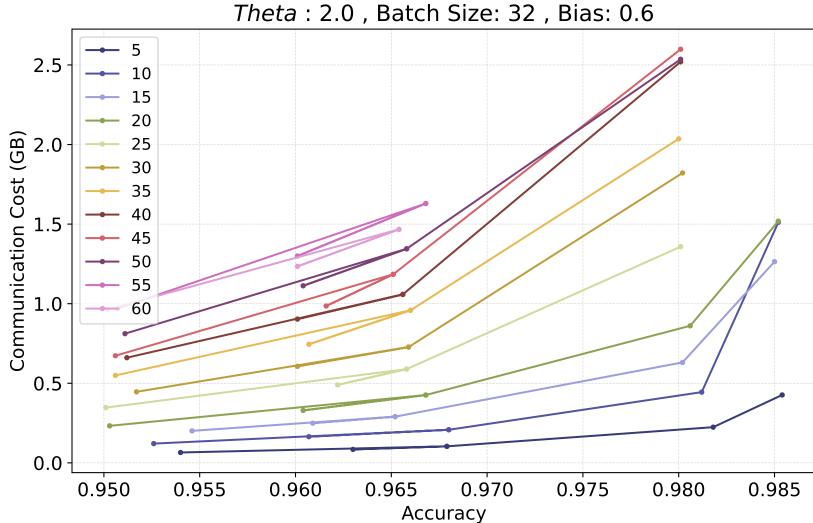
Theta: 2.0, Batch Size: 32, Bias: 0.6



linear
Theta: 2.0 Ratch Size: 3



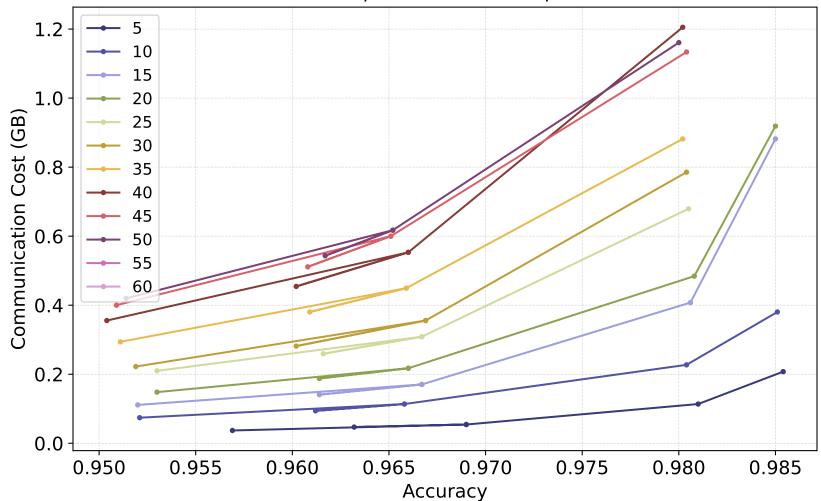
sketch



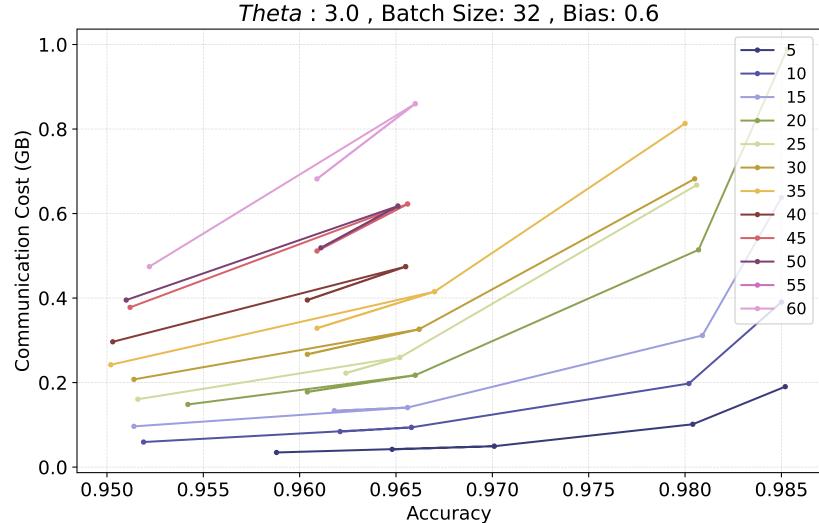
gm Theta: 3.0, Batch Size: 32, Bias: 0.6 1.6 10 1.4 15 20 Communication Cost (GB) 1.2 1.0 0.0 0.4 0.4 25 30 35 40 45 50 55 60 0.2 0.0 0.980 0.950 0.955 0.960 0.965 0.970 0.975 0.985 Accuracy

naive

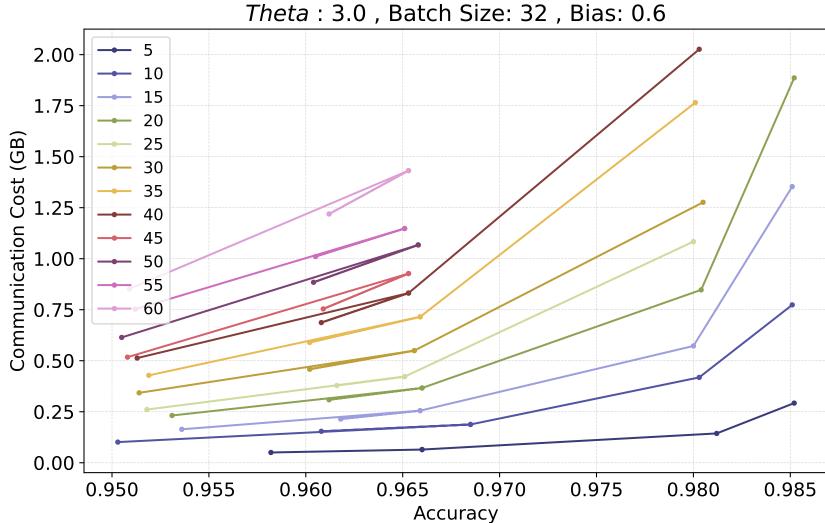
Theta: 3.0, Batch Size: 32, Bias: 0.6



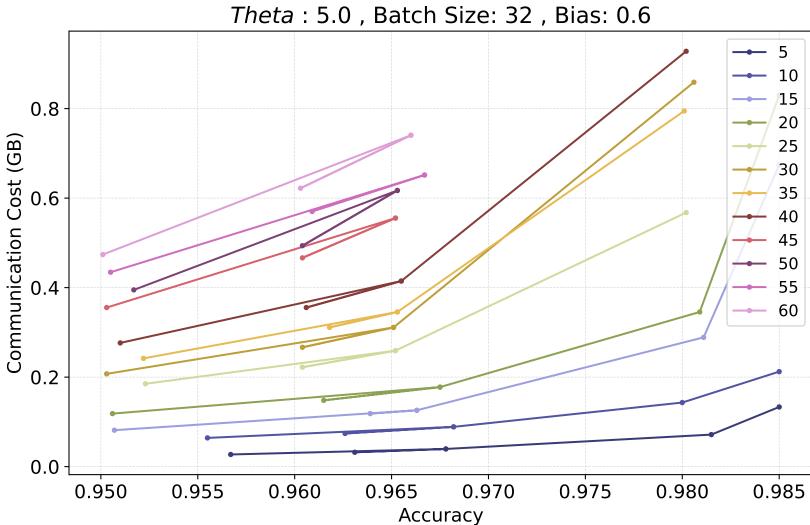
linear



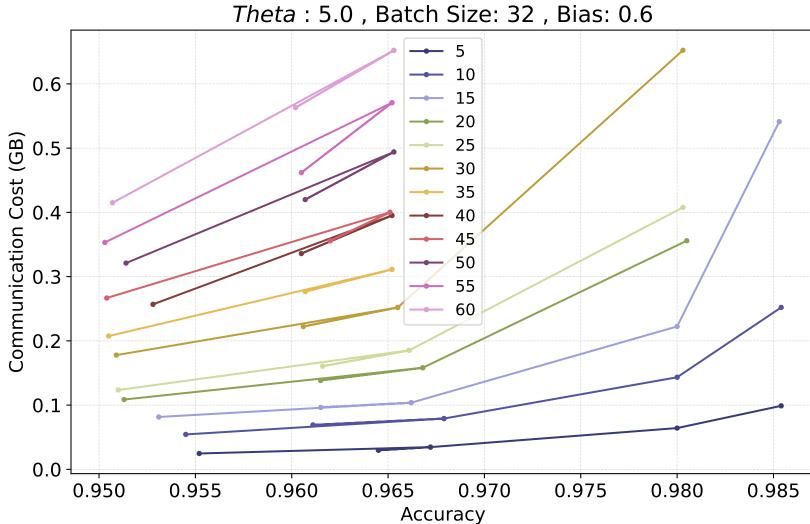
sketch



gm

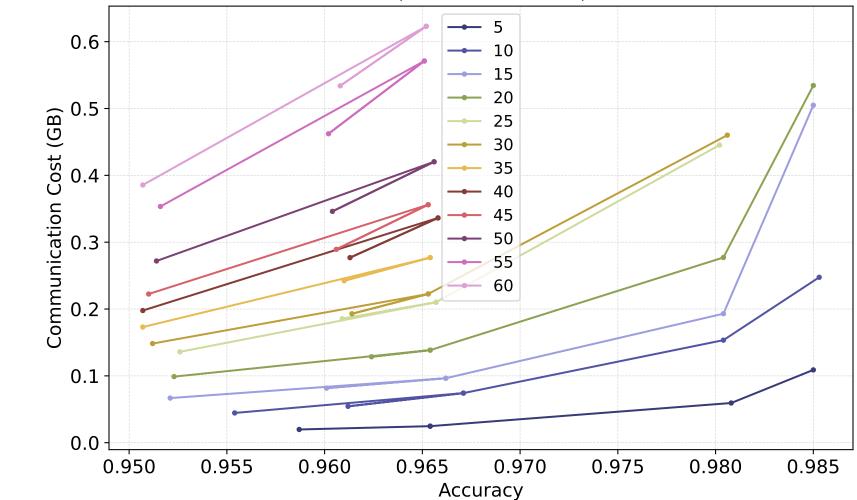


naive

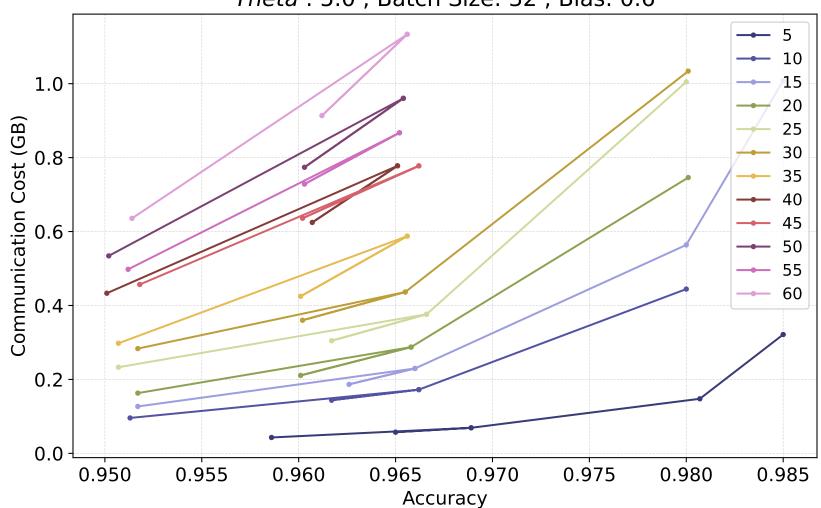


linear

Theta: 5.0, Batch Size: 32, Bias: 0.6



sketch Theta: 5.0, Batch Size: 32, Bias: 0.6

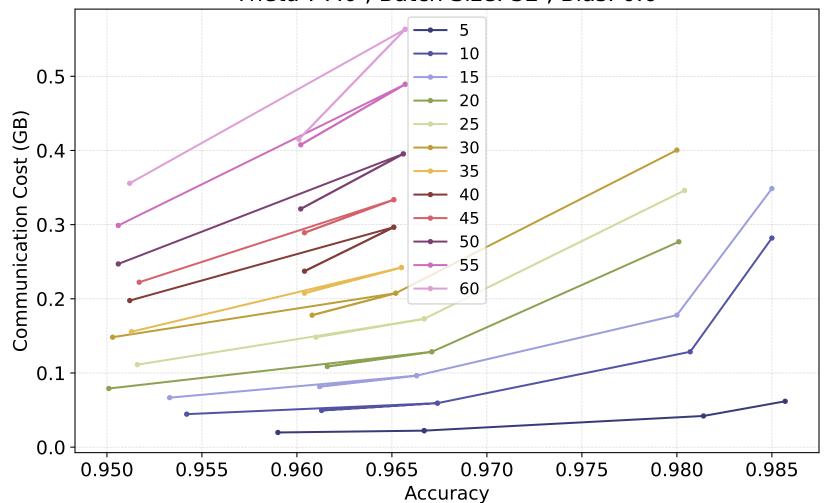


gm Theta: 7.0, Batch Size: 32, Bias: 0.6 0.6 10 15 20 25 30 35 40 45 50 55 60 0.1 0.0 0.950 0.955 0.960 0.965 0.970 0.975 0.980 0.985

Accuracy

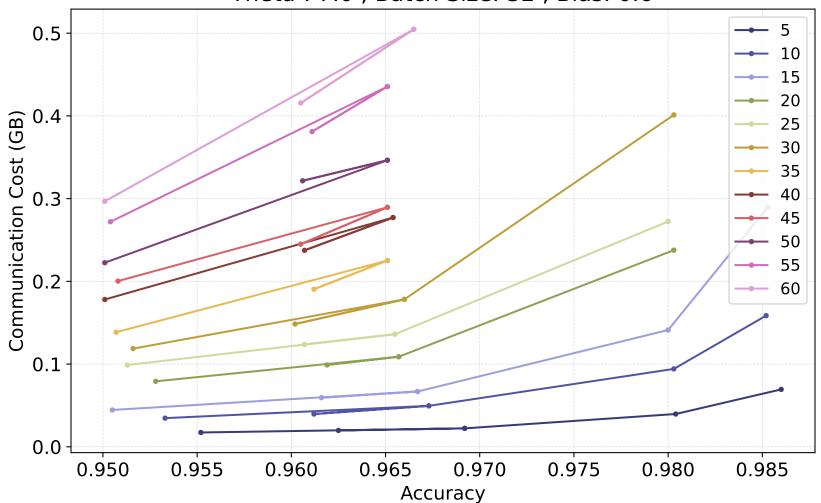
naive





linear

Theta: 7.0, Batch Size: 32, Bias: 0.6



sketch Theta: 7.0, Batch Size: 32, Bias: 0.6 1.2 1.0 Communication Cost (GB) 10 15 20 25 30 35 40 45 50 55 60 0.2 0.0

0.970

Accuracy

0.975

0.980

0.985

0.950

0.955

gm Theta: 10.0, Batch Size: 32, Bias: 0.6 10 15 0.4 20 Communication Cost (GB) 25 30 35 0.3 40 45 50 55 0.2 60 0.1 0.0

0.970

Accuracy

0.975

0.980

0.950

0.955

0.960

naive Theta: 10.0, Batch Size: 32, Bias: 0.6 0.40 10 15 0.35 20 Communication Cost (GB) 0.30 0.20 0.10 0.10 25 30 35 40 45 50 55 60 0.05

0.970

Accuracy

0.975

0.980

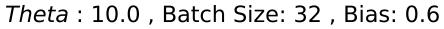
0.985

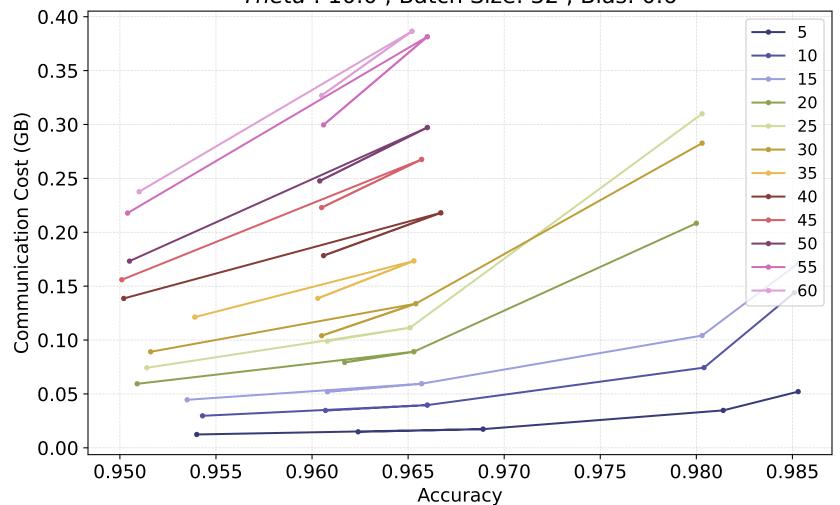
0.00

0.950

0.955

linear





sketch Theta: 10.0, Batch Size: 32, Bias: 0.6 10 1.0 20 25 30 0.8 35 40 45 0.6 50 55 60 0.4 0.2

0.965

0.975

0.970

Accuracy

0.980

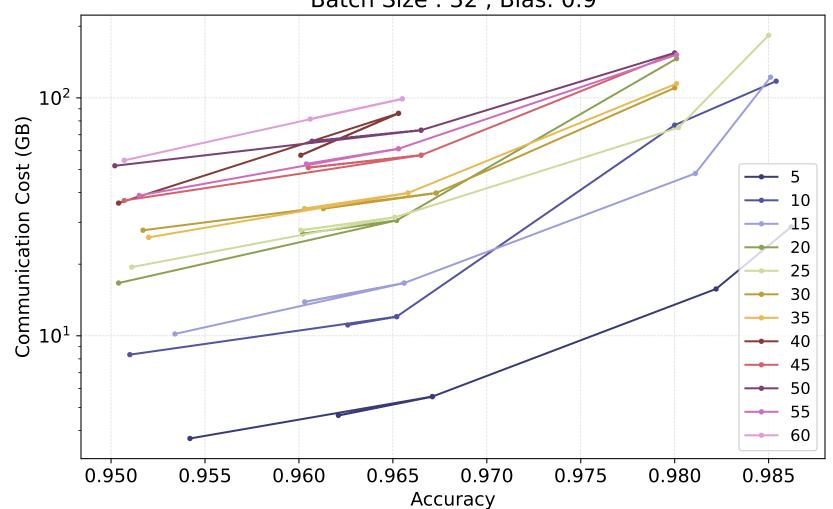
0.985

Communication Cost (GB)

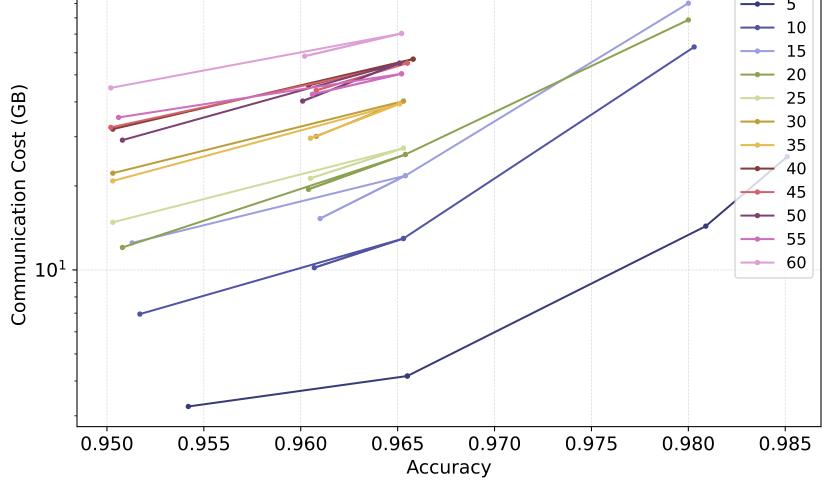
0.0

0.950

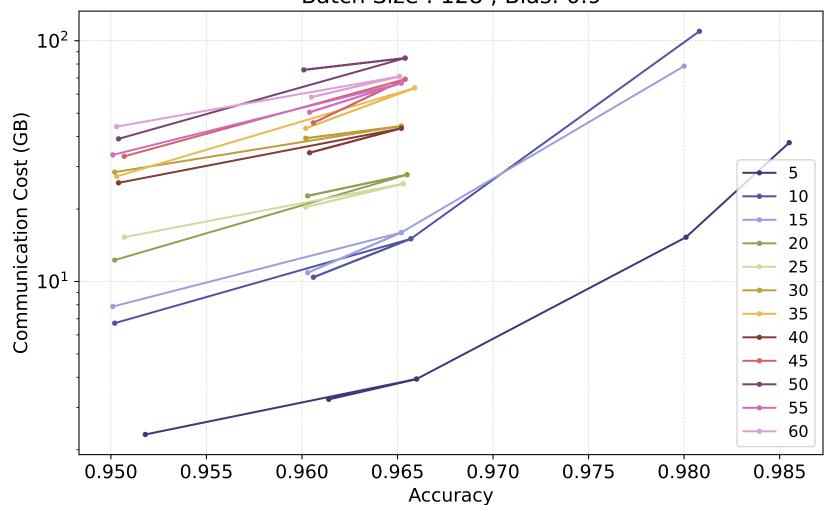




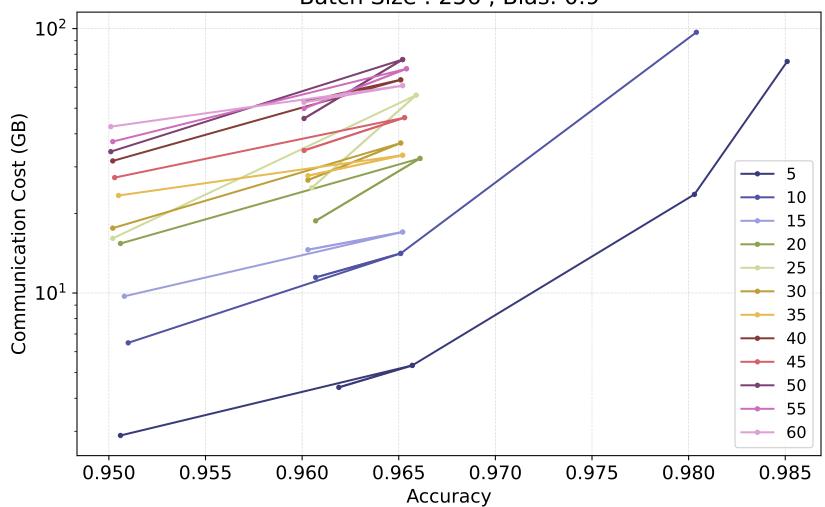
synchronous Batch Size: 64, Bias: 0.9 10^2 10^{1}

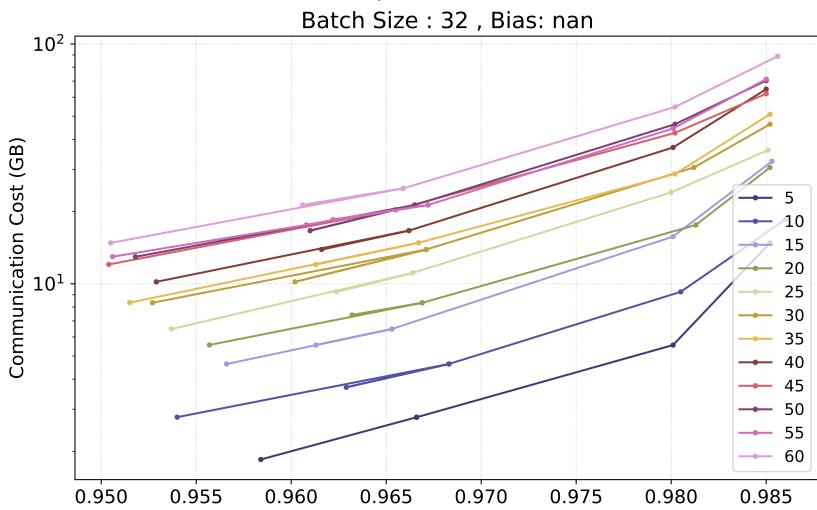


Batch Size: 128, Bias: 0.9



Batch Size: 256, Bias: 0.9

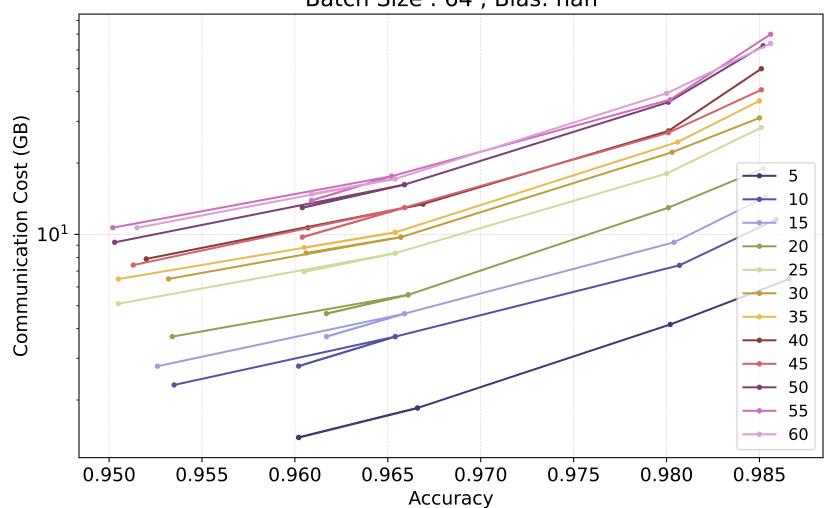




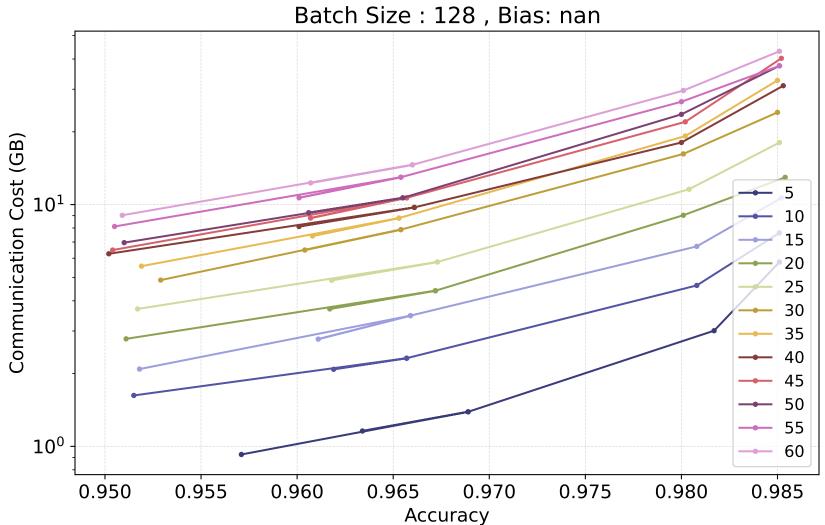
Accuracy

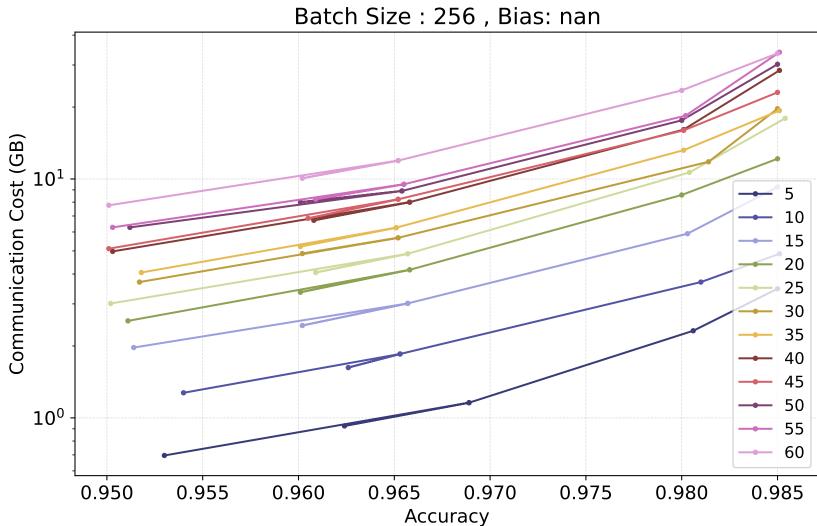
synchronous

Batch Size: 64, Bias: nan

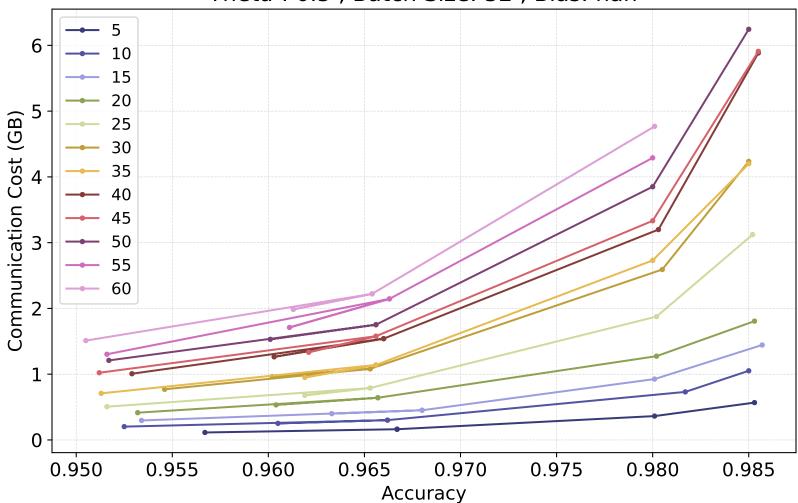


synchronous Batch Size : 128 . B



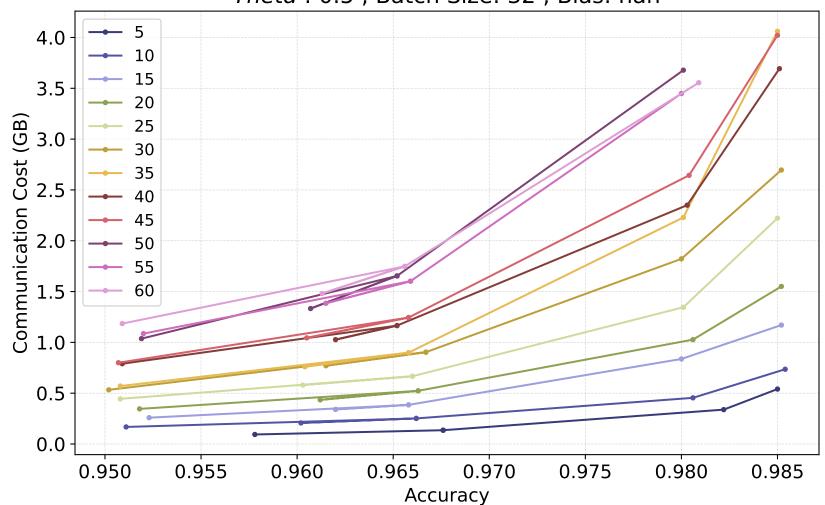


gm *Theta*: 0.5, Batch Size: 32, Bias: nan

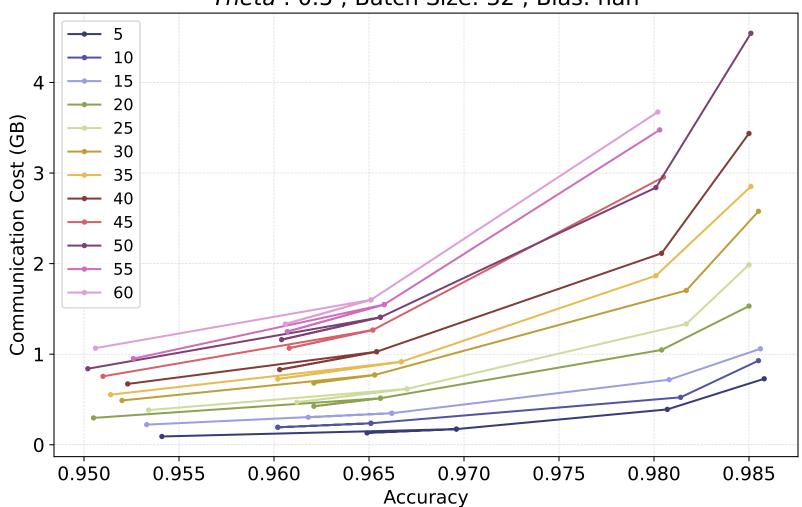


naive



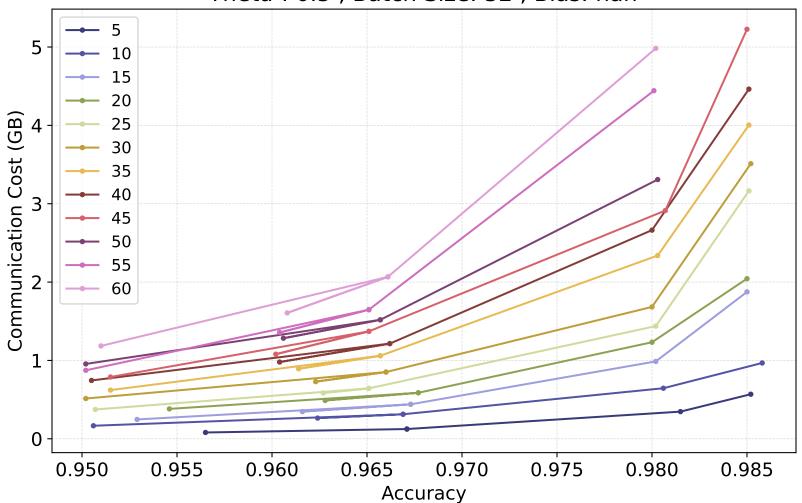


linear
Theta: 0.5, Batch Size: 32, Bias: nan

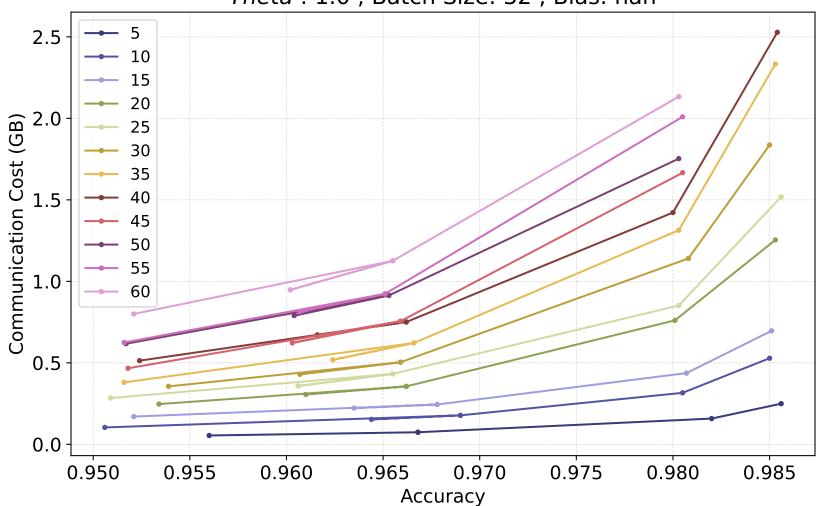


sketch

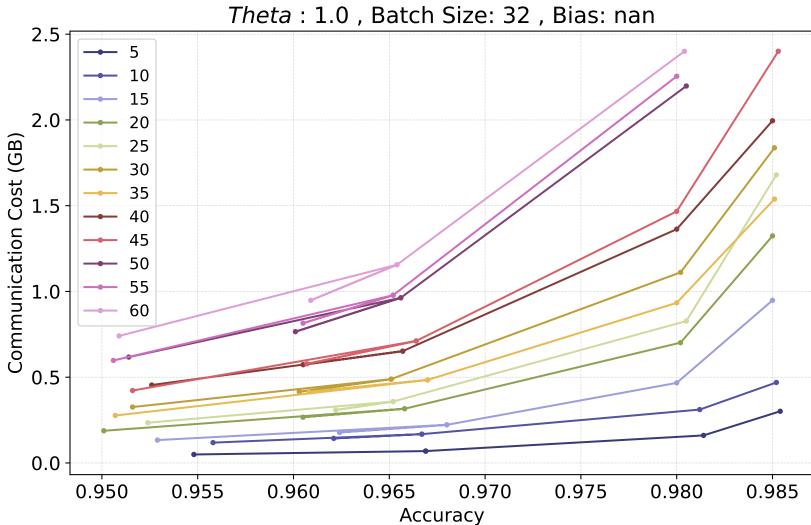
Theta: 0.5, Batch Size: 32, Bias: nan



naive Theta: 1.0, Batch Size: 32, Bias: nan

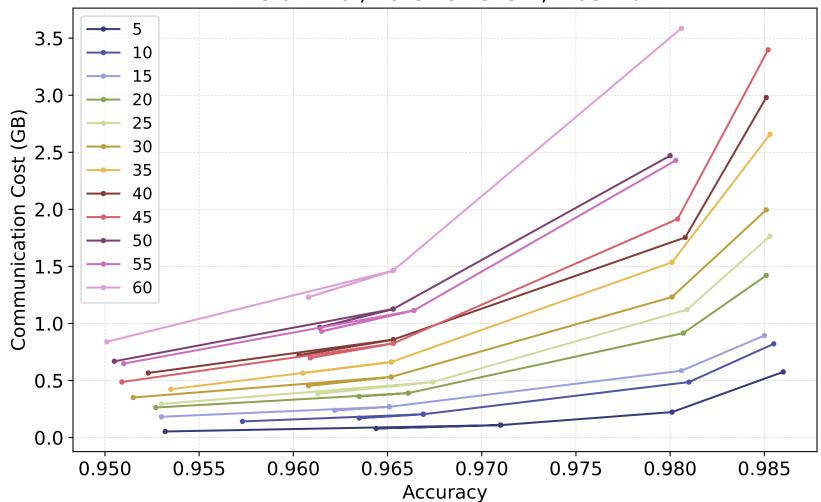


linear



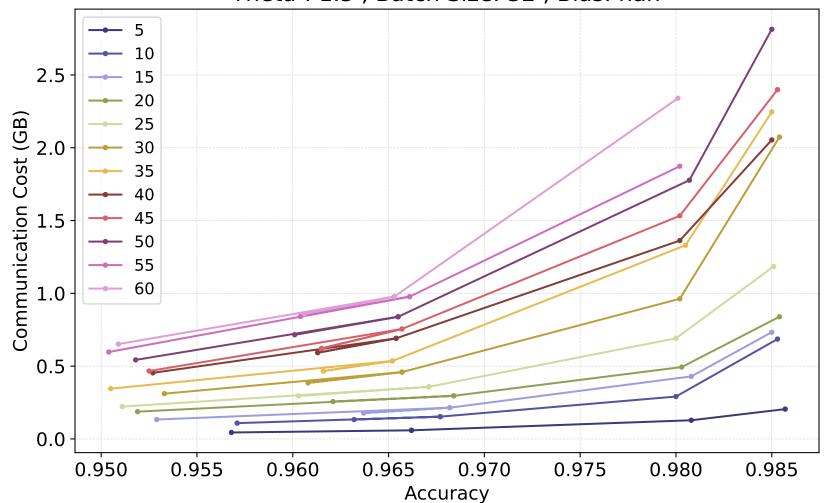
sketch

Theta: 1.0, Batch Size: 32, Bias: nan



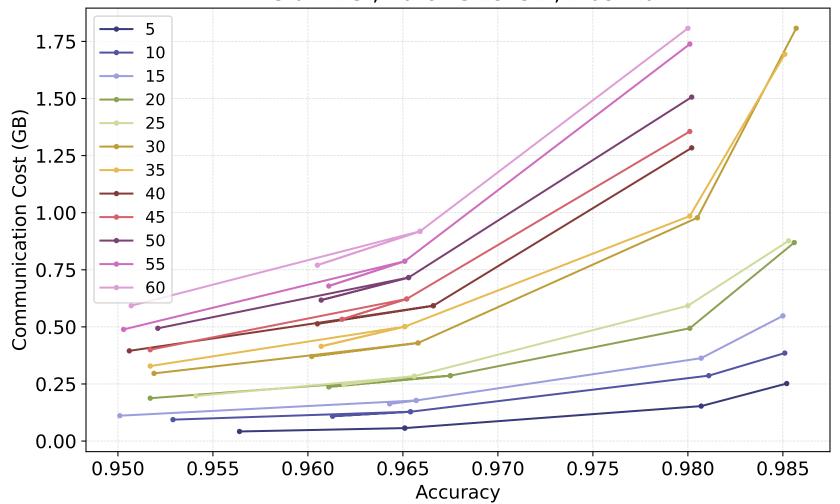
gm

Theta: 1.5, Batch Size: 32, Bias: nan



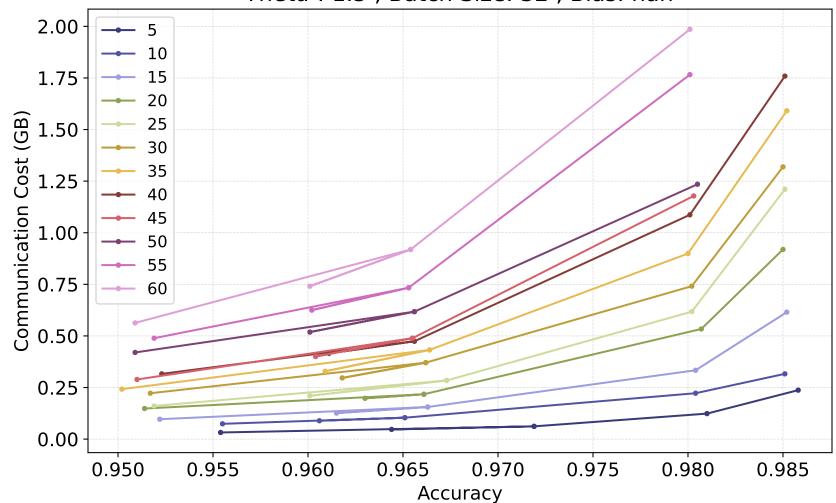
naive





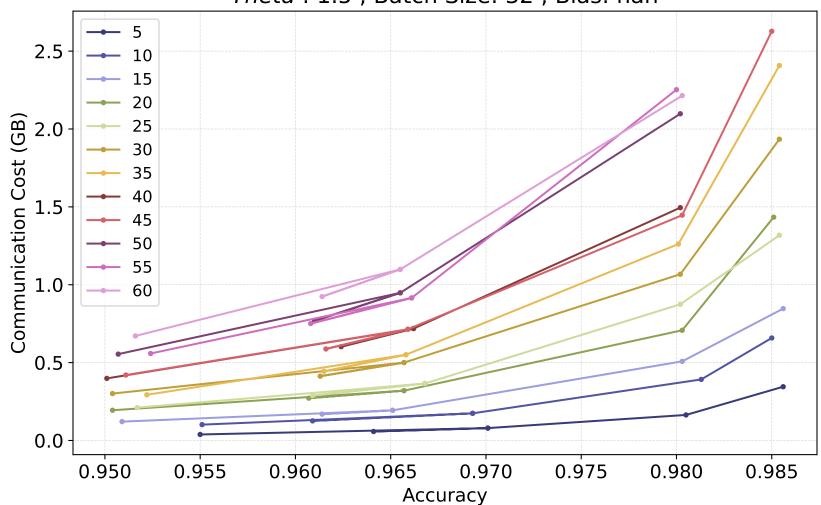
linear

Theta: 1.5, Batch Size: 32, Bias: nan

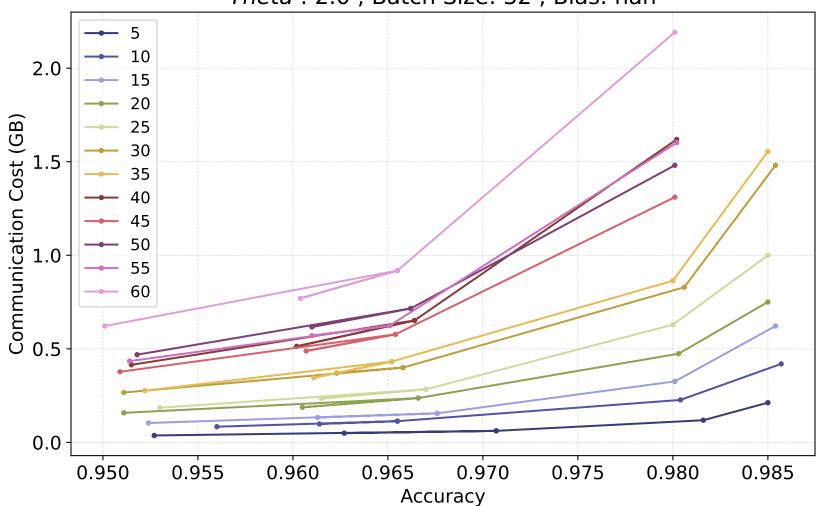


sketch

Theta: 1.5, Batch Size: 32, Bias: nan



gm *Theta*: 2.0, Batch Size: 32, Bias: nan



naive

0.960

0.965

1.4

Communication Cost (GB) 1.0 8.0 0.4 9.0 9.0 9.0

0.2

0.0

0.950

0.955



0.970

Accuracy

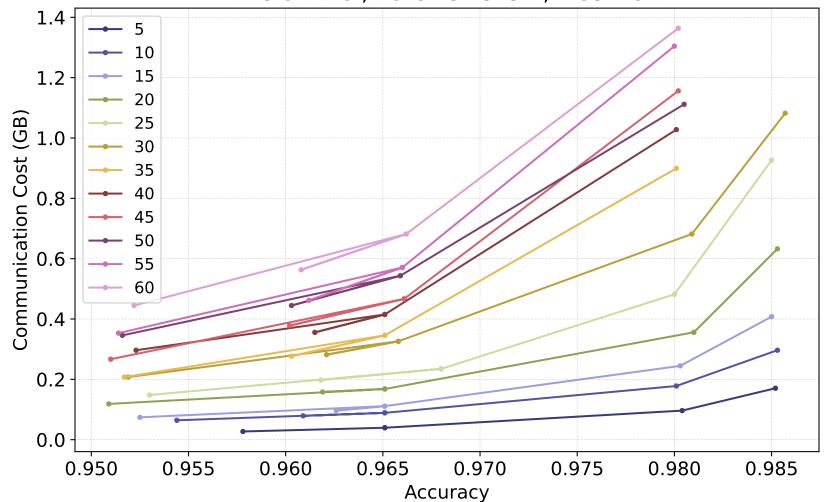
0.975

0.980

0.985

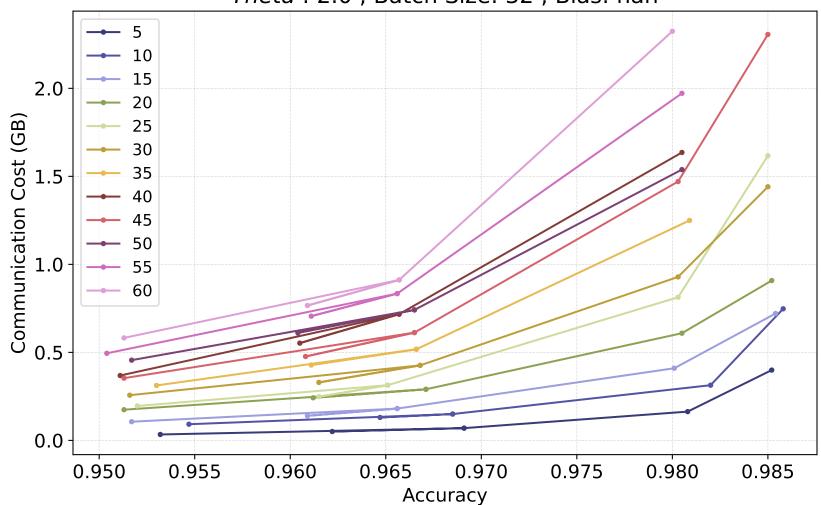
linear

Theta: 2.0, Batch Size: 32, Bias: nan

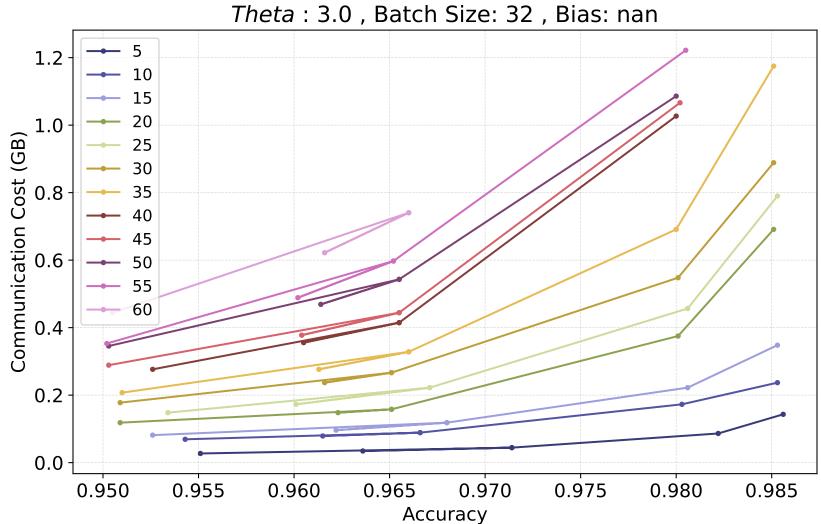


sketch

Theta: 2.0, Batch Size: 32, Bias: nan

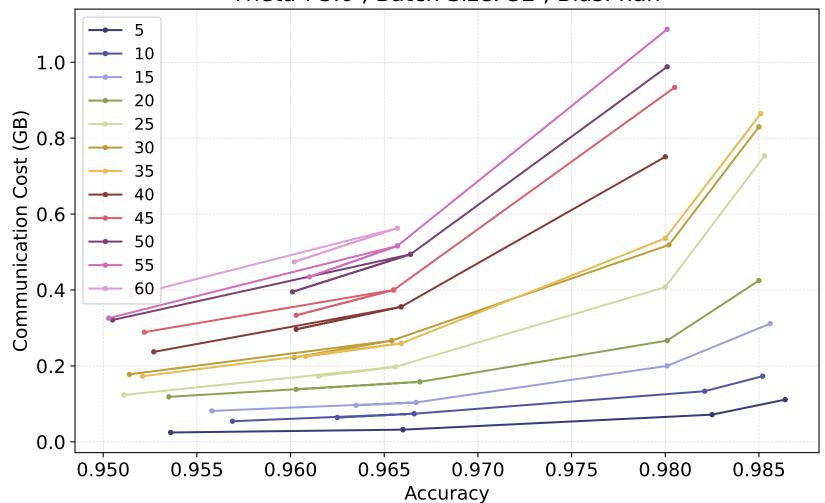


gm



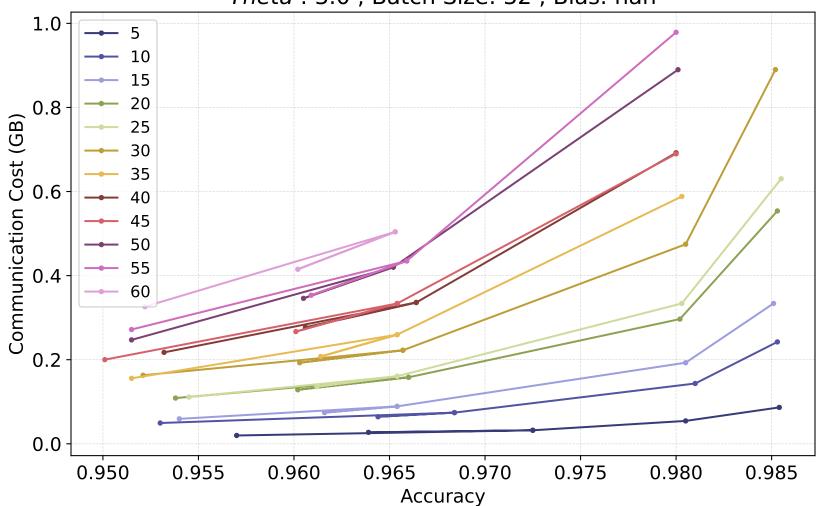
naive





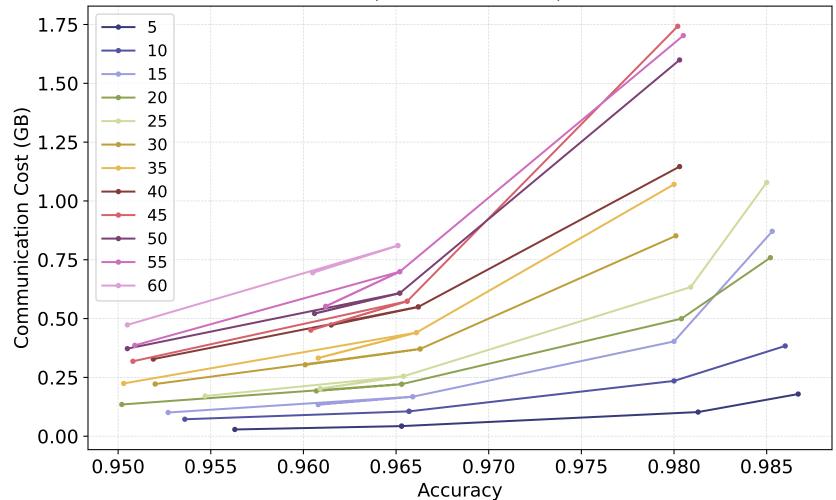
linear

Theta: 3.0, Batch Size: 32, Bias: nan

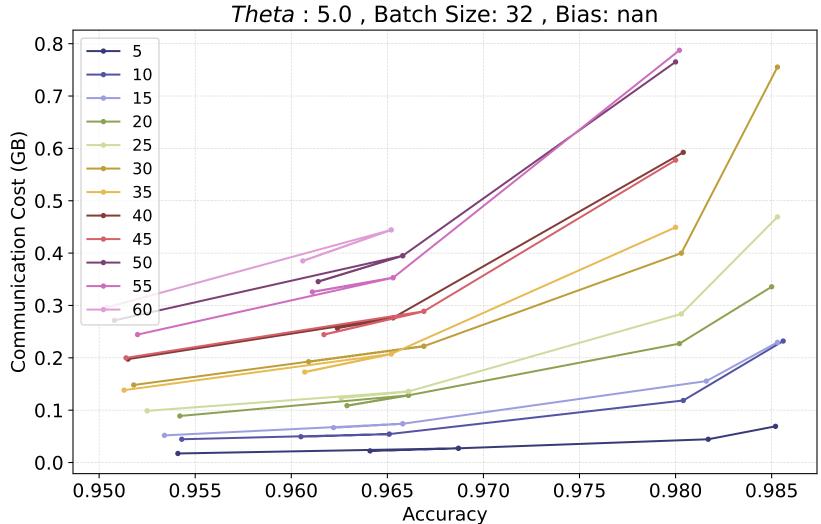


sketch

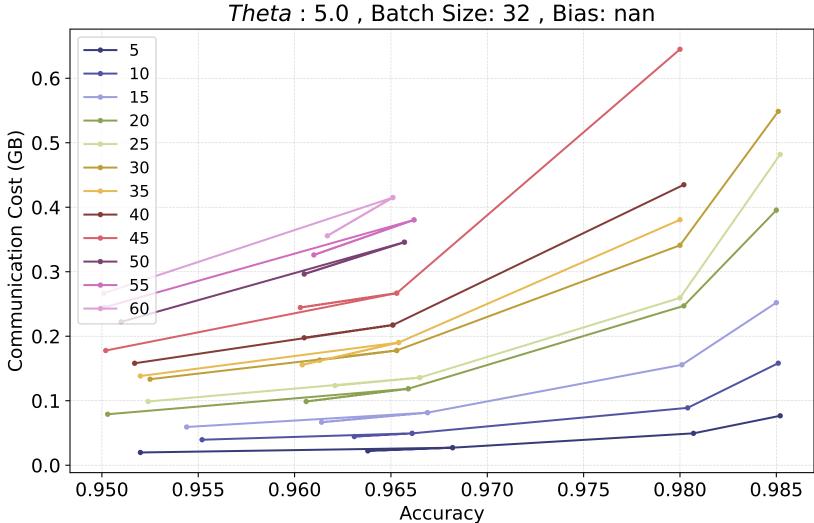
Theta: 3.0, Batch Size: 32, Bias: nan



gm

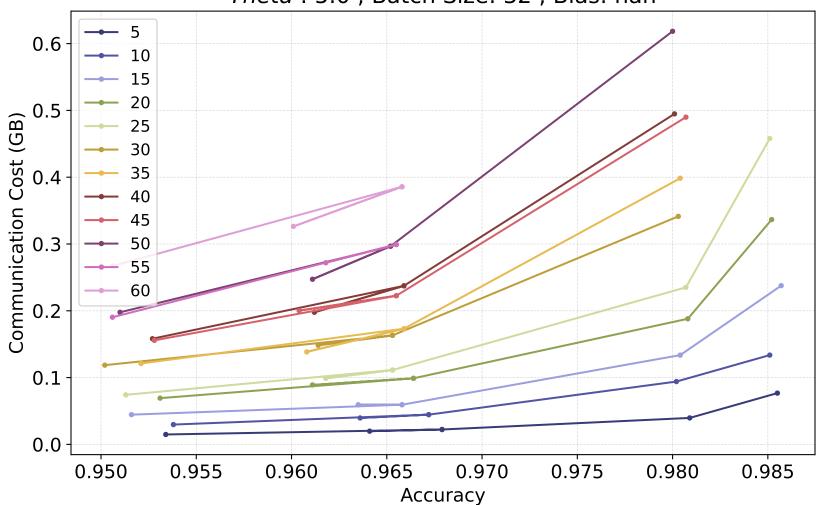


naive



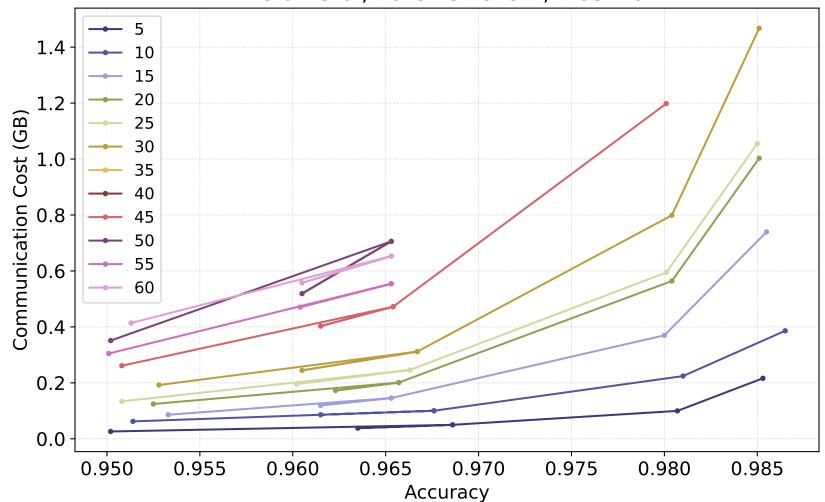
linear

Theta: 5.0, Batch Size: 32, Bias: nan



sketch

Theta: 5.0, Batch Size: 32, Bias: nan



gm Theta: 7.0, Batch Size: 32, Bias: nan 0.6 10 15 0.5 20 Communication Cost (GB)
0 0 0
0 0 25 30 35 40 45 50 55 60 0.1

0.965

0.970

Accuracy

0.975

0.980

0.985

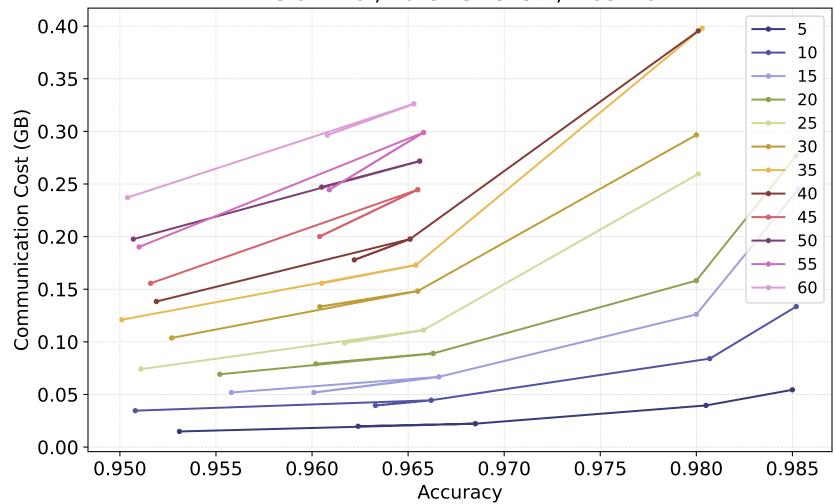
0.960

0.0

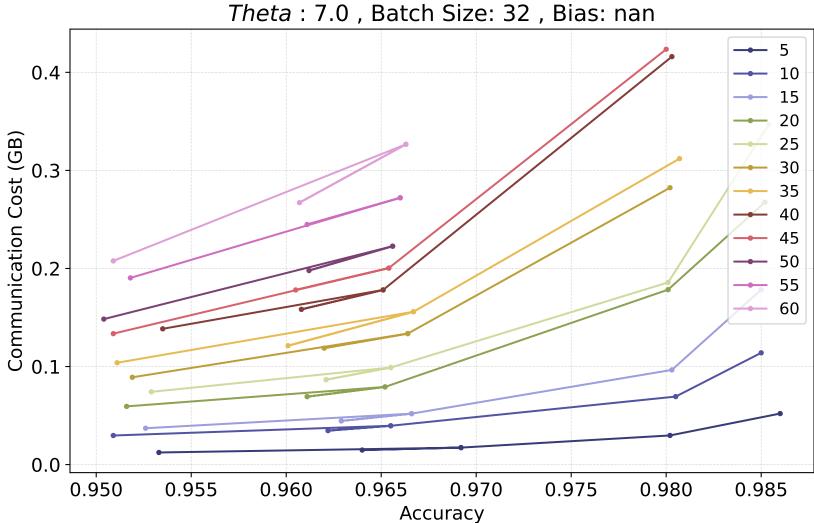
0.950

0.955

naive Theta: 7.0, Batch Size: 32, Bias: nan

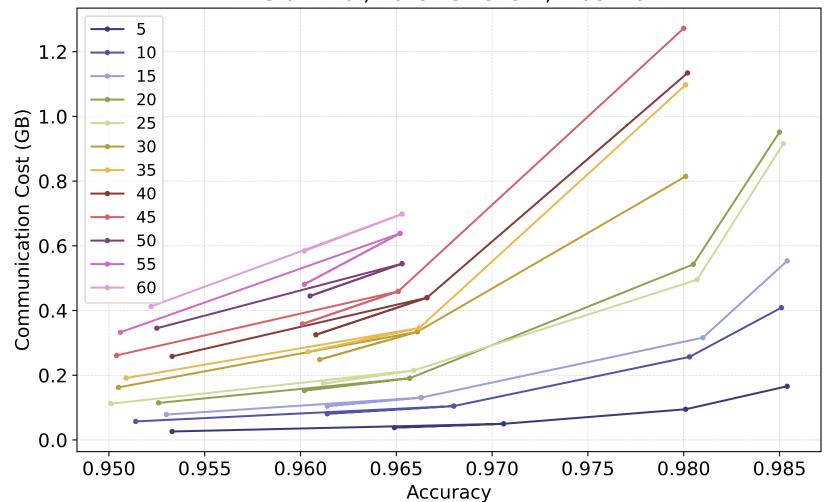


linear

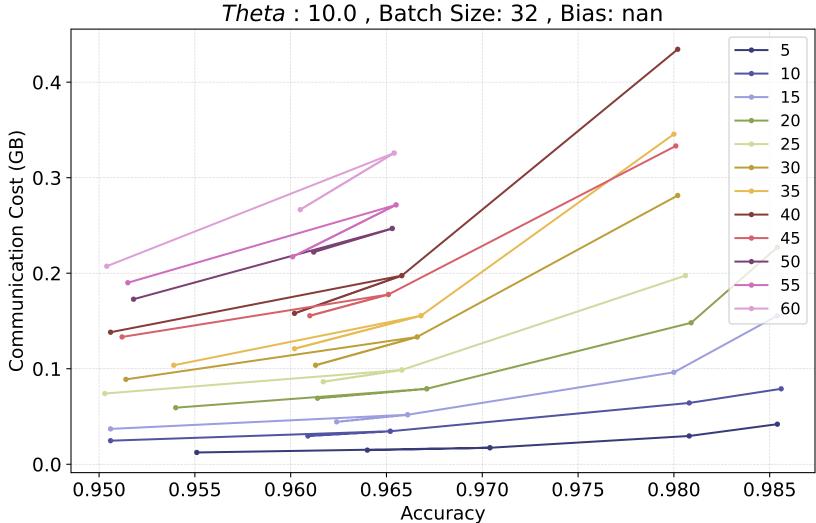


sketch

Theta: 7.0, Batch Size: 32, Bias: nan



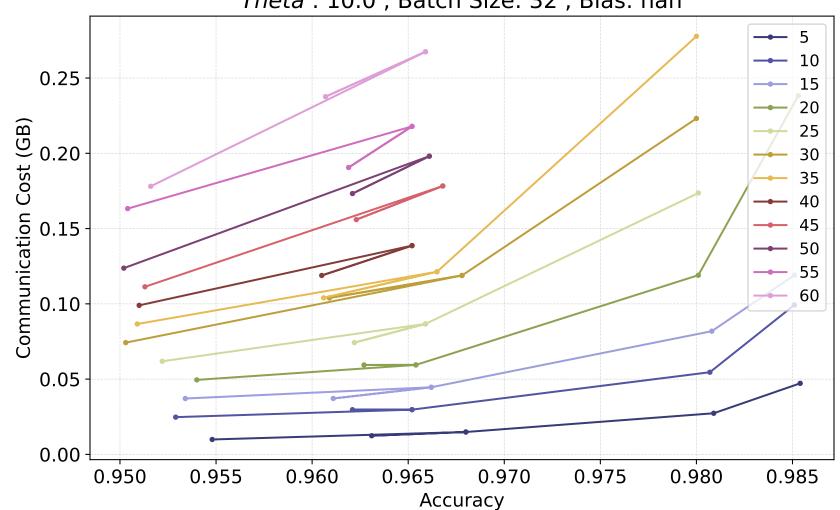
gm



naive Theta: 10.0, Batch Size: 32, Bias: nan 0.30 10 15 20 Communication Cost (GB) 0.20 0.10 0.10 25 30 35 40 45 50 55 60 0.05 0.00 0.985 0.950 0.955 0.960 0.965 0.970 0.975 0.980 Accuracy

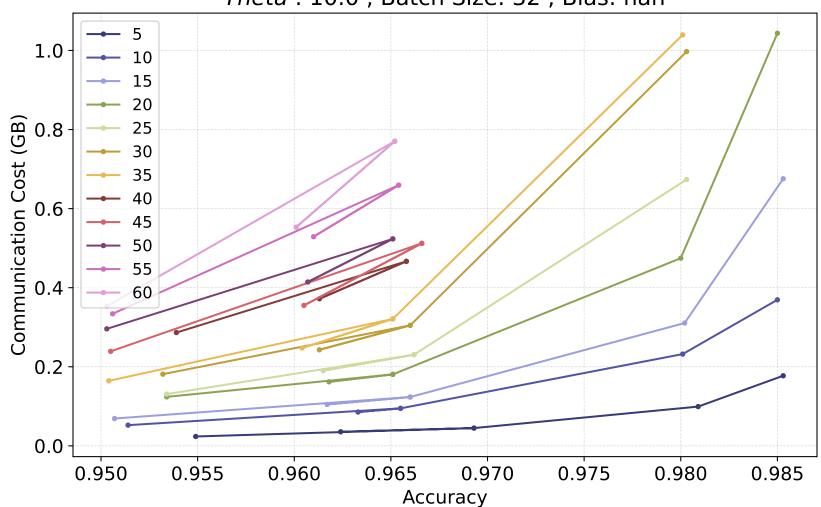
linear

Theta: 10.0, Batch Size: 32, Bias: nan



sketch

Theta: 10.0, Batch Size: 32, Bias: nan



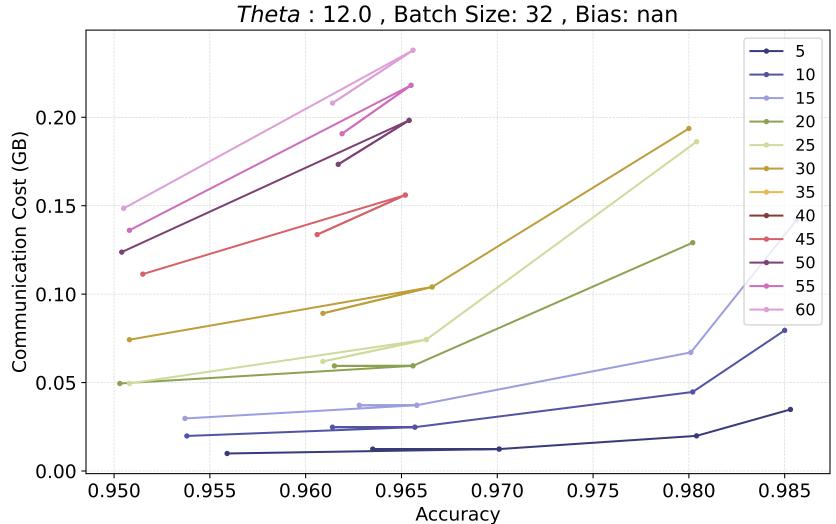
gm Theta: 12.0, Batch Size: 32, Bias: nan 10 0.30 15 20 Communication Cost (GB) 25 0.25 30 35 0.20 40 45 50 0.15 55 60 0.10 0.05 0.00 0.985 0.950 0.955 0.960 0.965 0.970 0.975 0.980

Accuracy

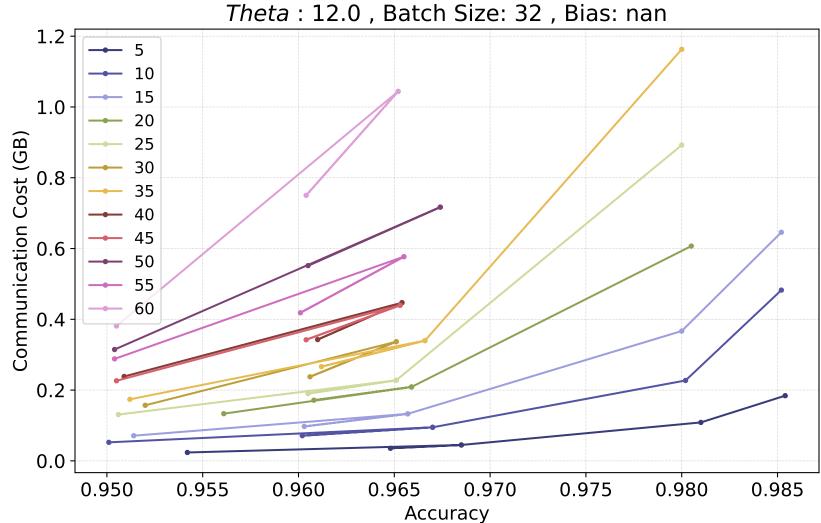
naive Theta: 12.0, Batch Size: 32, Bias: nan 0.25 10 20 Communication Cost (GB) 0.10 0.10 25 30 35 40 45 50 55 60 0.05 0.00 0.985 0.950 0.955 0.960 0.965 0.975 0.980 0.970

Accuracy

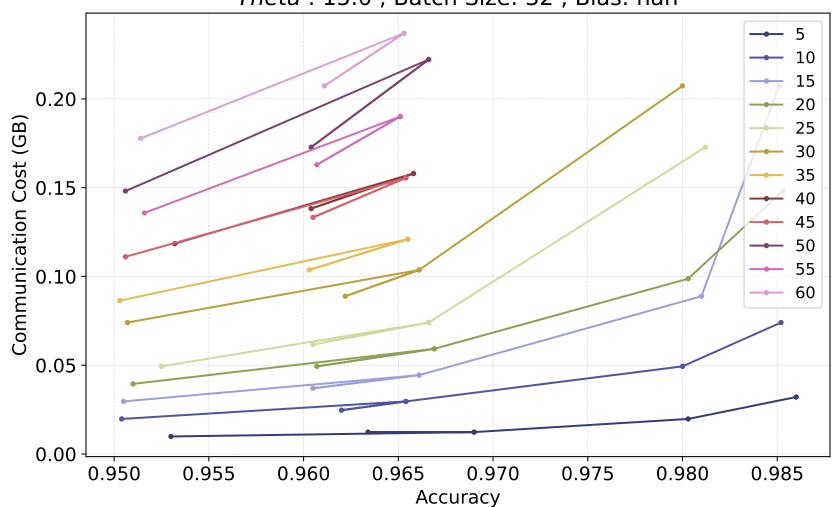
linear



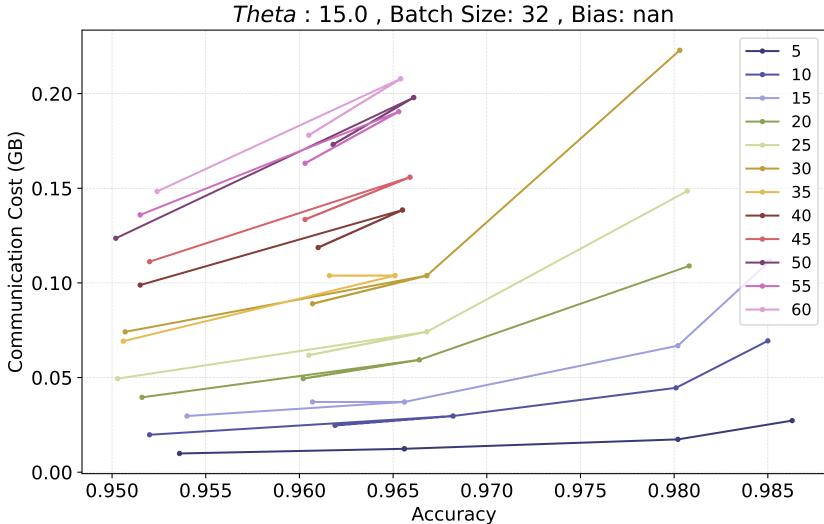
sketch Theta · 12 0 Batch Si



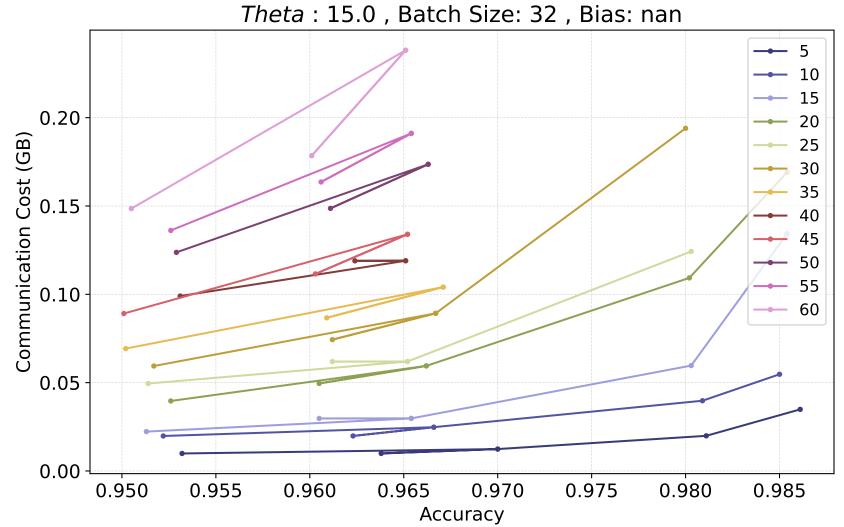
gm Theta: 15.0, Batch Size: 32, Bias: nan



naive



linear



sketch

