

A Appendix

Table 3 shows runtimes for each of the three Circa optimizations compared to ReLU baseline runtime.

Table 3: PI Runtime in seconds for baseline ReLU, naive sign and Circa stochastic ReLUs

Network-Dataset	#ReLUs (K)	ReLU	Sign	$\widetilde{\text{Sign}}$	$\widetilde{\text{Sign}}_k$
Res32-C100	303.10	6.32	5.51	4.50	2.47
Res18-C100	557.00	11.05	9.83	8.15	4.15
VGG16-C100	284.67	5.89	5.01	4.59	2.25
Res32-Tiny	1212.42	24.24	19.45	16.00	9.04
Res18-Tiny	2228.24	44.55	35.74	29.40	14.28
VGG16-Tiny	1114.10	21.41	17.91	14.68	6.96