

# Results

**Model** LeNet  
**Optimizer** SGD  
**Learning rate** 0.001  
**Batch size** 32  
*All attacks are black-box*

Method	Baseline	PGD linf, 10, 0.01					
Epochs	51						
Seed	Training time	Benign	4/255	8/255	16/255	32/255	
0	747		88.11	78.69	65.26	40.5	23.12
1	732		88.24	78.44	64.78	39.62	21.96
2	769		88.27	78.82	65.01	39.28	21.05
3	727		88.57	79.46	65.37	39.21	21.29
4	715		88.55	79.24	65.55	41	23.75
Mean	<b>738</b>		<b>88.35</b>	<b>78.93</b>	<b>65.19</b>	<b>39.92</b>	<b>22.23</b>
Std	20.78		0.2	0.41	0.3	0.79	1.17

Method	Isoreg	PGD linf, 10, 0.01					
Epochs	51						
Lambda	0.1						
Warm-up	1 epoch						
Epsilon	3.5 ~16/255						
Norm	Holder						
Seed	Training time	Benign	4/255	8/255	16/255	32/255	
0	3580		88.14	78.96	66.11	42.74	25.26
1	3650		88.12	78.22	65.07	40.88	24.08
2	3807		88.32	79.1	65.44	40.55	22.33
3	4029		88.6	79.47	66.07	41.14	22.95
4	3834		88.23	79.39	66.92	43.46	26.51
Mean	<b>3780</b>		<b>88.28</b>	<b>79.03</b>	<b>65.92</b>	<b>41.75</b>	<b>24.23</b>
Std	175.03		0.19	0.5	0.71	1.27	1.7

**Method** Isoreg

# Results

Epochs	51						
Lambda	3						
Warm-up	1 epoch						
Epsilon	3.5 ~16/255						
Norm	Holder						
Seed	Training time	Benign	PGD linf, 10, 0.01				
			4/255	8/255	16/255	32/255	
	0	3981	71.24	63.59	53.85	38.97	29.44
	1	4078	87.54	78.04	64.77	41.88	26.58
	2	3828	86.49	78.3	67.1	47.3	30.97
	3	3389	83.1	75.34	64.25	46.21	32.6
	4	3304	82.87	74.65	64.53	47.88	34.55
Mean		<b>3716</b>	<b>82.25</b>	<b>73.98</b>	<b>62.9</b>	<b>44.45</b>	<b>30.83</b>
Std		350.17	6.49	6.03	5.18	3.86	3.04

Method	Isoreg						
Epochs	51						
Lambda	4						
Warm-up	1 epoch						
Epsilon	3.5 ~16/255						
Norm	Holder						
Seed	Training time	Benign	PGD linf, 10, 0.01				
			4/255	8/255	16/255	32/255	
	5	3885	79.79	71.97	60.99	44.13	31.5
	6	3479	81.49	72.19	61.51	43.85	30.99
	7	3721	83.03	74.03	62.79	44.71	30.14
	8	3919	69.68	62.03	52.54	37.73	28.51
	9	3865	80.01	71.62	60.99	43.87	30.11
Mean		<b>3773.8</b>	<b>78.8</b>	<b>70.37</b>	<b>59.76</b>	<b>42.86</b>	<b>30.25</b>
Std		181.29	5.26	4.75	4.1	2.89	1.14

Method	Teacher						
Epochs	51						
Temp	20						
Seed	Training time	Benign	PGD linf, 10, 0.01				
			4/255	8/255	16/255	32/255	

# Results

	-5	832	81.36	75.02	66.66	49.77	34.01
	-4	838	81.68	74.92	65.92	48.41	32.44
	-3	831	81.3	75.2	68	53.05	37.63
	-2	834	81.09	74.67	66.92	51.03	35.64
	-1	850	81.23	75.22	67.12	51.45	35.82
<b>Mean</b>		<b>837</b>	<b>81.33</b>	<b>75.01</b>	<b>66.92</b>	<b>50.74</b>	<b>35.11</b>
<b>Std</b>		7.75	0.22	0.23	0.75	1.75	1.97

<b>Method</b>	Distillation						
<b>Epochs</b>	51						
<b>Temp</b>	20		PGD linf, 10, 0.01				
<b>Seed</b>	<b>Training time</b>	<b>Benign</b>	<b>4/255</b>	<b>8/255</b>	<b>16/255</b>	<b>32/255</b>	
	0	1385	79.07	74.1	68.37	56.36	43.22
	1	1391	79.69	74.22	67.63	53.91	39.31
	2	1394	78.97	74.74	69.71	59.59	47.77
	3	1385	78.98	74.02	68.27	56.21	42.46
	4	1380	79.29	74.34	68.16	56.13	42.61
<b>Mean</b>		<b>1387</b>	<b>79.2</b>	<b>74.28</b>	<b>68.43</b>	<b>56.44</b>	<b>43.07</b>
<b>Std</b>		5.52	0.3	0.28	0.77	2.03	3.03

<b>Method</b>	Gn						
<b>Epochs</b>	51						
<b>Std</b>	16/255		PGD linf, 10, 0.01				
<b>Seed</b>	<b>Training time</b>	<b>Benign</b>	<b>4/255</b>	<b>8/255</b>	<b>16/255</b>	<b>32/255</b>	
	0	814	87.77	79.95	68.83	45.85	25.69
	1	837	87.68	80.17	68.5	44.65	24.67
	2	831	87.87	80.09	69.04	44.76	24.04
	3	833	88.12	80.55	69.77	45.54	24.13
	4	846	88.19	80.54	68.83	46.28	26.72
<b>Mean</b>		<b>832.2</b>	<b>87.93</b>	<b>80.26</b>	<b>68.99</b>	<b>45.42</b>	<b>25.05</b>
<b>Std</b>		11.69	0.22	0.27	0.47	0.7	1.14

# Results

Method	FGSM						
Epochs	51						
Budget	16/255		PGD linf, 10, 0.01				
Seed	Training time	Benign	4/255	8/255	16/255	32/255	
0	1410		83.95	82.64	81.26	77.84	70.94
1	1425		84.11	82.92	81.6	77.89	70.16
2	1433		84.05	82.66	81.17	77.72	69.93
3	1410		84.23	83.1	81.68	78.28	70.6
4	1403		84.33	83.04	81.56	78.54	72.33
Mean	1416.2		84.13	82.87	81.45	78.05	70.79
Std	12.36		0.15	0.21	0.22	0.34	0.94