1 Clean training data. 1000 MNIST subset

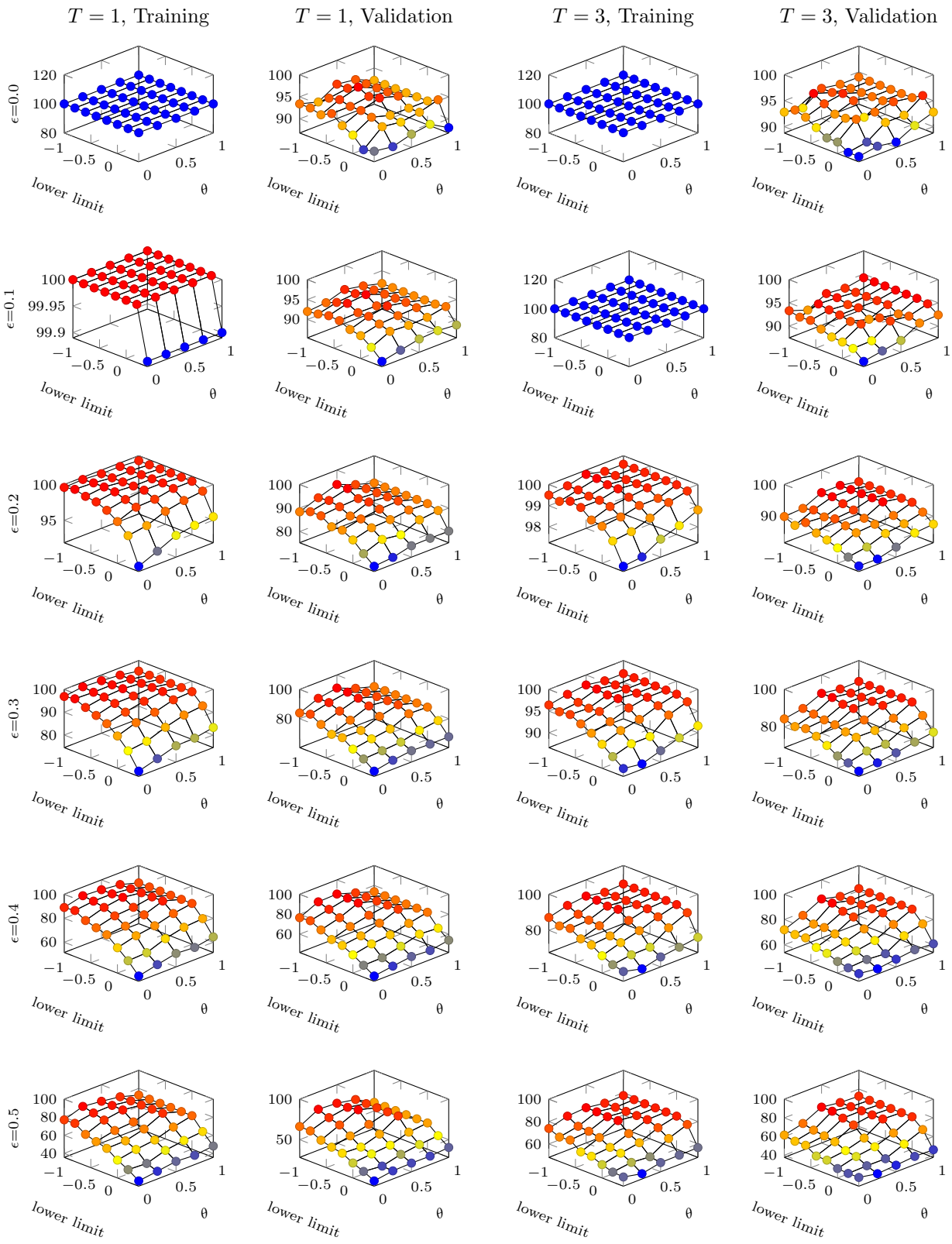

Figure 1: Classification accuracy vs different levels of Gaussian noise data corruption as a function of two hyperparameters: 1) lower limit of the stability function, and 2) θ; $\alpha_{div} = 1.0$.

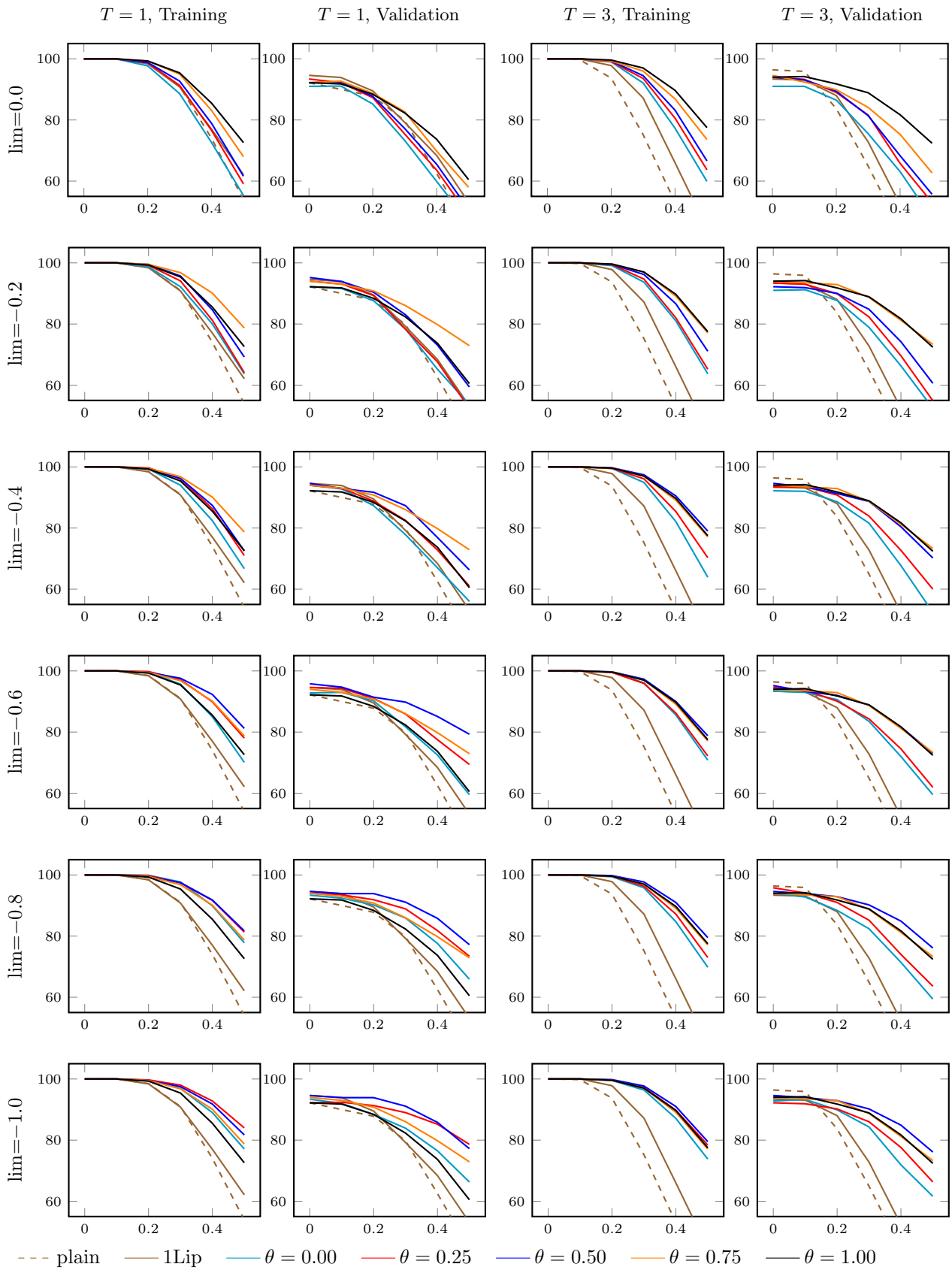

Figure 2: Classification accuracy for different levels of Gaussian noise data corruption and lower limits of the stability function. $a_{div} = 1.0$.

Noise ϵ	Top-1 accuracy, lim=0.0						
	plain	1Lip	$\theta = 0$	0.25	0.50	0.75	1.00
0.00	**100.00** (92.20)	100.00 (**94.60**)	100.00 (91.00)	100.00 (93.40)	100.00 (92.20)	100.00 (92.20)	100.00 (92.20)
0.10	**100.00** (90.00)	100.00 (**93.90**)	100.00 (91.10)	100.00 (92.20)	100.00 (92.50)	100.00 (92.70)	100.00 (91.80)
0.20	98.50 (87.80)	98.40 (**89.50**)	97.70 (85.20)	98.70 (87.30)	98.80 (87.70)	**99.30** (88.70)	99.30 (88.40)
0.30	91.00 (79.80)	90.80 (79.20)	88.60 (73.30)	91.30 (75.40)	92.70 (77.20)	95.00 (**82.70**)	**95.40** (82.30)
0.40	74.00 (62.50)	77.00 (68.40)	72.60 (59.90)	76.60 (63.60)	78.90 (65.50)	83.10 (69.80)	**85.50** (**73.70**)
0.50	53.90 (44.50)	62.10 (53.10)	55.30 (46.60)	59.10 (48.90)	61.60 (50.80)	68.00 (58.00)	**72.60** (**60.50**)

Noise ϵ	Top-1 accuracy, lim=-0.2						
	plain	1Lip	$\theta = 0$	0.25	0.50	0.75	1.00
0.00	**100.00** (92.20)	100.00 (94.60)	100.00 (92.20)	100.00 (94.00)	100.00 (**95.20**)	100.00 (94.00)	100.00 (92.20)
0.10	**100.00** (90.00)	100.00 (**93.90**)	100.00 (91.60)	100.00 (93.10)	100.00 (93.90)	100.00 (93.00)	100.00 (91.80)
0.20	98.50 (87.80)	98.40 (89.50)	98.70 (87.60)	99.20 (89.30)	**99.50** (90.40)	99.50 (**90.80**)	99.30 (88.40)
0.30	91.00 (79.80)	90.80 (79.20)	92.20 (78.30)	94.10 (78.30)	95.70 (83.00)	**96.80** (**86.00**)	95.40 (82.30)
0.40	74.00 (62.50)	77.00 (68.40)	80.00 (65.20)	81.20 (67.60)	84.60 (73.10)	**90.10** (**79.80**)	85.50 (73.70)
0.50	53.90 (44.50)	62.10 (53.10)	63.70 (53.60)	64.10 (52.30)	69.20 (59.40)	**78.70** (**72.90**)	72.60 (60.50)

Noise ϵ	Top-1 accuracy, lim=-0.4						
	plain	1Lip	$\theta = 0$	0.25	0.50	0.75	1.00
0.00	**100.00** (92.20)	100.00 (**94.60**)	100.00 (94.00)	100.00 (94.00)	100.00 (94.60)	100.00 (94.00)	100.00 (92.20)
0.10	**100.00** (90.00)	100.00 (**93.90**)	100.00 (92.80)	100.00 (93.00)	100.00 (92.90)	100.00 (93.00)	100.00 (91.80)
0.20	98.50 (87.80)	98.40 (89.50)	99.30 (87.30)	**99.70** (88.80)	99.50 (**91.70**)	99.50 (90.80)	99.30 (88.40)
0.30	91.00 (79.80)	90.80 (79.20)	94.00 (77.80)	96.10 (82.50)	96.20 (**87.30**)	**96.80** (86.00)	95.40 (82.30)
0.40	74.00 (62.50)	77.00 (68.40)	82.40 (67.00)	86.30 (72.80)	87.40 (76.90)	**90.10** (**79.80**)	85.50 (73.70)
0.50	53.90 (44.50)	62.10 (53.10)	66.70 (56.00)	71.00 (61.00)	72.50 (66.30)	**78.70** (**72.90**)	72.60 (60.50)

Noise ϵ	Top-1 accuracy, lim=-0.6						
	plain	1Lip	$\theta = 0$	0.25	0.50	0.75	1.00
0.00	**100.00** (92.20)	100.00 (94.60)	100.00 (92.80)	100.00 (94.60)	100.00 (**95.80**)	100.00 (94.00)	100.00 (92.20)
0.10	**100.00** (90.00)	100.00 (93.90)	100.00 (93.00)	100.00 (94.30)	100.00 (**94.70**)	100.00 (93.00)	100.00 (91.80)
0.20	98.50 (87.80)	98.40 (89.50)	99.50 (90.20)	**99.80** (91.00)	99.50 (**91.40**)	99.50 (90.80)	99.30 (88.40)
0.30	91.00 (79.80)	90.80 (79.20)	95.70 (81.70)	97.10 (85.90)	**97.60** (**89.80**)	96.80 (86.00)	95.40 (82.30)
0.40	74.00 (62.50)	77.00 (68.40)	85.00 (72.50)	89.90 (77.50)	**92.30** (**85.10**)	90.10 (79.80)	85.50 (73.70)
0.50	53.90 (44.50)	62.10 (53.10)	70.10 (59.50)	78.00 (69.40)	**81.20** (**79.30**)	78.70 (72.90)	72.60 (60.50)

Noise ϵ	Top-1 accuracy, lim=-0.8						
	plain	1Lip	$\theta = 0$	0.25	0.50	0.75	1.00
0.00	**100.00** (92.20)	100.00 (**94.60**)	100.00 (93.40)	100.00 (94.00)	100.00 (94.60)	100.00 (94.00)	100.00 (92.20)
0.10	**100.00** (90.00)	100.00 (**93.90**)	100.00 (92.40)	100.00 (93.50)	100.00 (93.90)	100.00 (93.00)	100.00 (91.80)
0.20	98.50 (87.80)	98.40 (89.50)	**99.90** (90.20)	99.80 (91.90)	99.50 (**93.90**)	99.50 (90.80)	99.30 (88.40)
0.30	91.00 (79.80)	90.80 (79.20)	**97.70** (85.90)	97.40 (88.90)	97.50 (**91.10**)	96.80 (86.00)	95.40 (82.30)
0.40	74.00 (62.50)	77.00 (68.40)	89.90 (77.60)	91.70 (81.80)	**91.80** (**85.80**)	90.10 (79.80)	85.50 (73.70)
0.50	53.90 (44.50)	62.10 (53.10)	77.80 (65.90)	81.30 (73.40)	**81.70** (**77.20**)	78.70 (72.90)	72.60 (60.50)

Noise ϵ	Top-1 accuracy, lim=-1.0						
	plain	1Lip	$\theta = 0$	0.25	0.50	0.75	1.00
0.00	**100.00** (92.20)	100.00 (**94.60**)	100.00 (93.40)	100.00 (92.20)	100.00 (94.60)	100.00 (94.00)	100.00 (92.20)
0.10	**100.00** (90.00)	100.00 (**93.90**)	100.00 (92.00)	100.00 (92.40)	100.00 (93.90)	100.00 (93.00)	100.00 (91.80)
0.20	98.50 (87.80)	98.40 (89.50)	99.60 (88.40)	**99.70** (91.30)	99.50 (**93.90**)	99.50 (90.80)	99.30 (88.40)
0.30	91.00 (79.80)	90.80 (79.20)	96.90 (83.90)	**98.00** (89.00)	97.50 (**91.10**)	96.80 (86.00)	95.40 (82.30)
0.40	74.00 (62.50)	77.00 (68.40)	89.00 (76.50)	**92.80** (85.20)	91.80 (**85.80**)	90.10 (79.80)	85.50 (73.70)
0.50	53.90 (44.50)	62.10 (53.10)	77.10 (66.30)	**84.00** (**78.60**)	81.70 (77.20)	78.70 (72.90)	72.60 (60.50)

Table 1: Classification accuracy for different levels of Gaussian noise data corruption and lower limits of the stability function. $T = 1$, $a_{div} = 1.0$.

Noise ϵ	Top-1 accuracy, lim=0.0						
	plain	1Lip	$\theta = 0$	0.25	0.50	0.75	1.00
0.00	**100.00** (**96.40**)	100.00 (93.40)	100.00 (91.00)	100.00 (94.00)	100.00 (94.00)	100.00 (94.60)	100.00 (94.00)
0.10	99.80 (**95.90**)	**100.00** (93.10)	100.00 (91.00)	100.00 (93.30)	100.00 (93.10)	100.00 (92.40)	100.00 (94.20)
0.20	93.70 (83.70)	97.80 (88.00)	99.00 (86.50)	99.10 (89.00)	99.30 (89.40)	99.30 (89.90)	**99.60** (**91.80**)
0.30	75.20 (64.90)	87.20 (72.80)	92.10 (75.50)	93.60 (81.60)	94.50 (81.40)	96.00 (84.10)	**97.00** (**88.90**)
0.40	53.10 (44.30)	66.00 (52.30)	77.30 (63.10)	80.60 (65.80)	83.20 (68.30)	86.90 (75.30)	**89.70** (**81.70**)
0.50	38.30 (31.20)	44.50 (38.20)	59.90 (47.80)	63.70 (53.00)	66.60 (55.70)	73.60 (62.70)	**77.50** (**72.40**)

Noise ϵ	Top-1 accuracy, lim=-0.2						
	plain	1Lip	$\theta = 0$	0.25	0.50	0.75	1.00
0.00	**100.00** (**96.40**)	100.00 (93.40)	100.00 (91.00)	100.00 (93.40)	100.00 (92.20)	100.00 (94.00)	100.00 (94.00)
0.10	99.80 (**95.90**)	**100.00** (93.10)	100.00 (91.20)	100.00 (93.00)	100.00 (91.90)	100.00 (93.50)	100.00 (94.20)
0.20	93.70 (83.70)	97.80 (88.00)	99.10 (87.70)	99.40 (89.90)	99.50 (90.00)	**99.60** (**92.90**)	99.60 (91.80)
0.30	75.20 (64.90)	87.20 (72.80)	93.70 (78.90)	94.70 (82.30)	96.20 (84.80)	**97.00** (88.70)	97.00 (**88.90**)
0.40	53.10 (44.30)	66.00 (52.30)	81.00 (66.30)	82.00 (69.60)	86.60 (74.20)	89.10 (81.20)	**89.70** (**81.70**)
0.50	38.30 (31.20)	44.50 (38.20)	63.70 (52.40)	65.20 (54.90)	71.10 (60.60)	77.10 (**73.30**)	**77.50** (72.40)

Noise ϵ	Top-1 accuracy, lim=-0.4						
	plain	1Lip	$\theta = 0$	0.25	0.50	0.75	1.00
0.00	**100.00** (**96.40**)	100.00 (93.40)	100.00 (92.20)	100.00 (93.40)	100.00 (94.60)	100.00 (94.00)	100.00 (94.00)
0.10	99.80 (**95.90**)	**100.00** (93.10)	100.00 (92.00)	100.00 (93.50)	100.00 (93.50)	100.00 (93.50)	100.00 (94.20)
0.20	93.70 (83.70)	97.80 (88.00)	99.50 (88.60)	99.50 (90.80)	**99.70** (91.30)	99.60 (**92.90**)	99.60 (91.80)
0.30	75.20 (64.90)	87.20 (72.80)	94.90 (81.60)	96.10 (83.90)	**97.40** (88.70)	97.00 (88.70)	97.00 (**88.90**)
0.40	53.10 (44.30)	66.00 (52.30)	82.10 (67.70)	85.40 (72.70)	**90.50** (80.40)	89.10 (81.20)	89.70 (**81.70**)
0.50	38.30 (31.20)	44.50 (38.20)	63.90 (52.40)	70.30 (60.00)	**79.00** (70.20)	77.10 (**73.30**)	77.50 (72.40)

Noise ϵ	Top-1 accuracy, lim=-0.6						
	plain	1Lip	$\theta = 0$	0.25	0.50	0.75	1.00
0.00	**100.00** (**96.40**)	100.00 (93.40)	100.00 (93.40)	100.00 (94.60)	100.00 (95.20)	100.00 (94.00)	100.00 (94.00)
0.10	99.80 (**95.90**)	**100.00** (93.10)	100.00 (93.00)	100.00 (93.70)	100.00 (93.30)	100.00 (93.50)	100.00 (94.20)
0.20	93.70 (83.70)	97.80 (88.00)	99.60 (90.60)	99.50 (90.10)	**99.70** (92.00)	99.60 (**92.90**)	99.60 (91.80)
0.30	75.20 (64.90)	87.20 (72.80)	96.10 (83.50)	95.90 (84.30)	**97.30** (88.80)	97.00 (88.70)	97.00 (**88.90**)
0.40	53.10 (44.30)	66.00 (52.30)	85.60 (72.00)	86.20 (74.50)	**90.00** (81.60)	89.10 (81.20)	89.70 (**81.70**)
0.50	38.30 (31.20)	44.50 (38.20)	70.80 (59.50)	72.20 (61.90)	**78.80** (73.10)	77.10 (**73.30**)	77.50 (72.40)

Noise ϵ	Top-1 accuracy, lim=-0.8						
	plain	1Lip	$\theta = 0$	0.25	0.50	0.75	1.00
0.00	**100.00** (**96.40**)	100.00 (93.40)	100.00 (94.00)	100.00 (95.80)	100.00 (94.60)	100.00 (94.00)	100.00 (94.00)
0.10	99.80 (**95.90**)	**100.00** (93.10)	100.00 (92.80)	100.00 (94.10)	100.00 (93.90)	100.00 (93.50)	100.00 (94.20)
0.20	93.70 (83.70)	97.80 (88.00)	99.40 (88.40)	99.60 (91.00)	**99.80** (**92.90**)	99.60 (92.90)	99.60 (91.80)
0.30	75.20 (64.90)	87.20 (72.80)	95.80 (82.40)	96.30 (85.20)	**97.70** (**90.20**)	97.00 (88.70)	97.00 (88.90)
0.40	53.10 (44.30)	66.00 (52.30)	84.70 (71.40)	87.20 (74.00)	**91.00** (**84.90**)	89.10 (81.20)	89.70 (81.70)
0.50	38.30 (31.20)	44.50 (38.20)	69.80 (59.40)	73.00 (63.60)	**79.50** (**76.10**)	77.10 (73.30)	77.50 (72.40)

Noise ϵ	Top-1 accuracy, lim=-1.0						
	plain	1Lip	$\theta = 0$	0.25	0.50	0.75	1.00
0.00	**100.00** (**96.40**)	100.00 (93.40)	100.00 (92.80)	100.00 (92.20)	100.00 (94.60)	100.00 (94.00)	100.00 (94.00)
0.10	99.80 (**95.90**)	**100.00** (93.10)	100.00 (93.30)	100.00 (91.90)	100.00 (93.90)	100.00 (93.50)	100.00 (94.20)
0.20	93.70 (83.70)	97.80 (88.00)	99.50 (89.90)	99.60 (90.20)	**99.80** (**92.90**)	99.60 (92.90)	99.60 (91.80)
0.30	75.20 (64.90)	87.20 (72.80)	96.40 (84.30)	97.20 (86.00)	**97.70** (**90.20**)	97.00 (88.70)	97.00 (88.90)
0.40	53.10 (44.30)	66.00 (52.30)	87.10 (71.90)	89.80 (77.60)	**91.00** (**84.90**)	89.10 (81.20)	89.70 (81.70)
0.50	38.30 (31.20)	44.50 (38.20)	73.80 (61.60)	78.40 (66.30)	**79.50** (**76.10**)	77.10 (73.30)	77.50 (72.40)

Table 2: Classification accuracy for different levels of Gaussian noise data corruption and lower limits of the stability function. $T = 3$, $a_{div} = 1.0$.

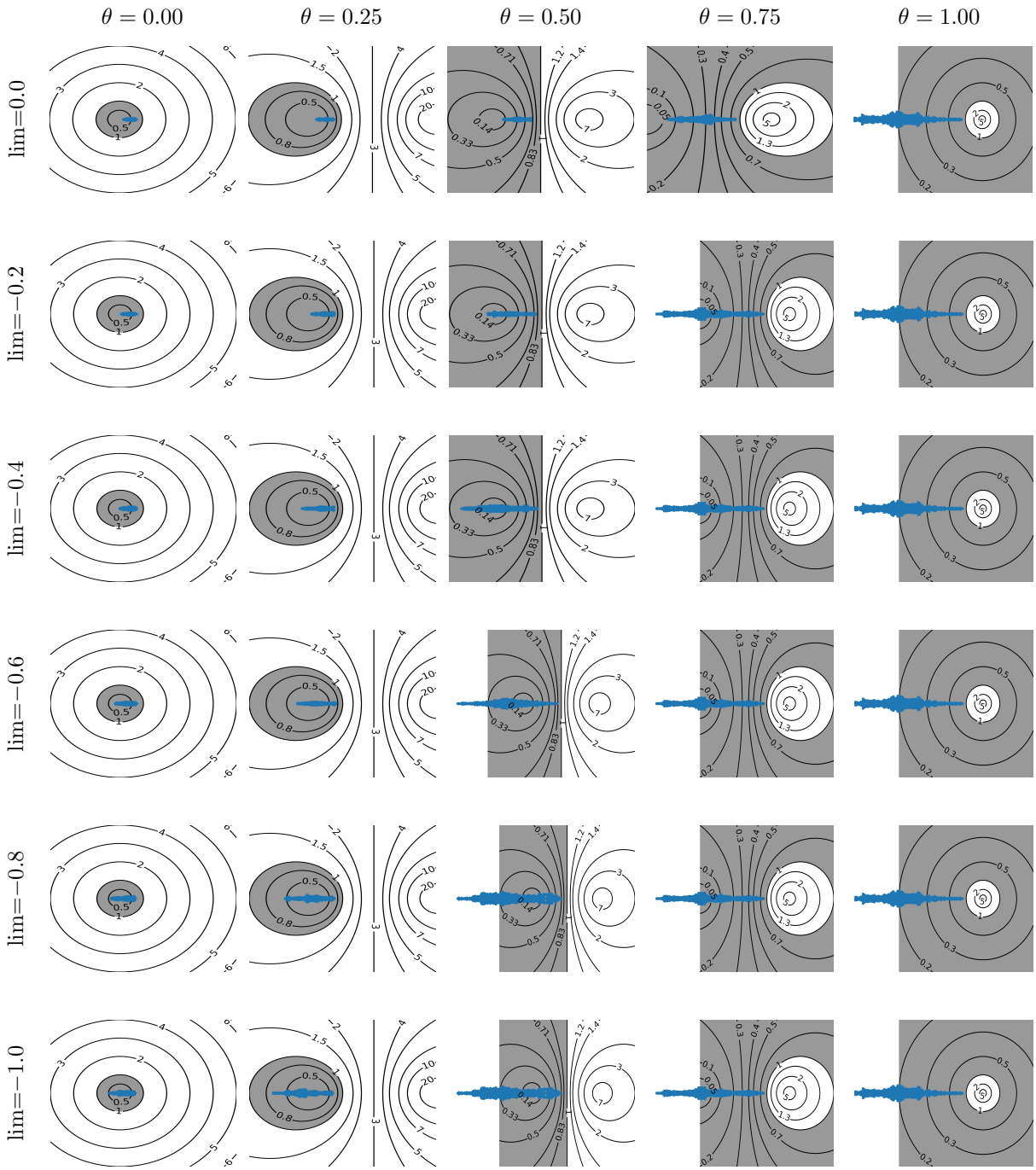

Figure 3: Eigenvalues of the vector field along 5 trajectories. $T = 1$, $a_{div} = 1.0$, 0.ode.

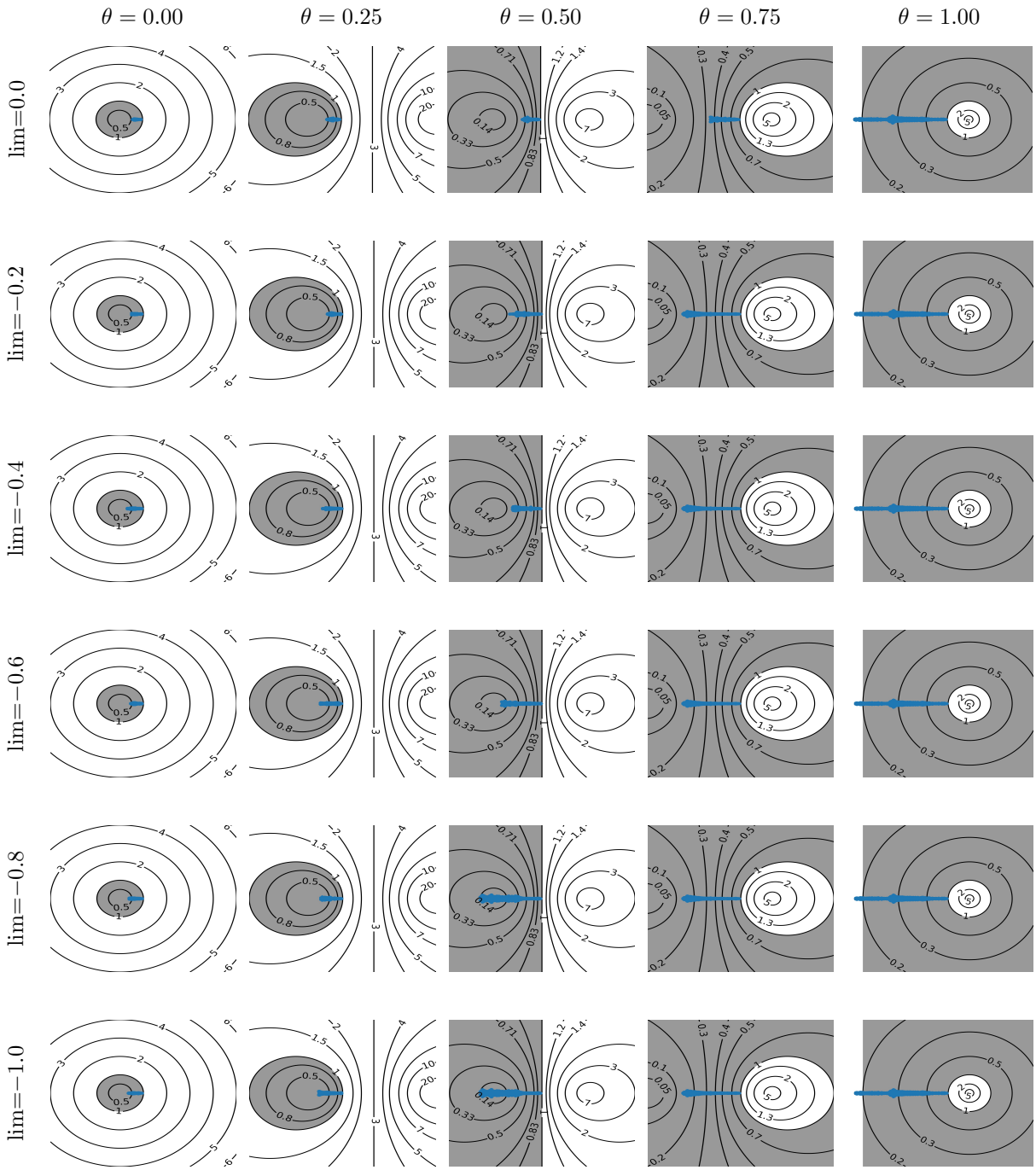

Figure 4: Eigenvalues of the vector field along 5 trajectories. $T = 3$, $a_{div} = 1.0$, 0.ode.

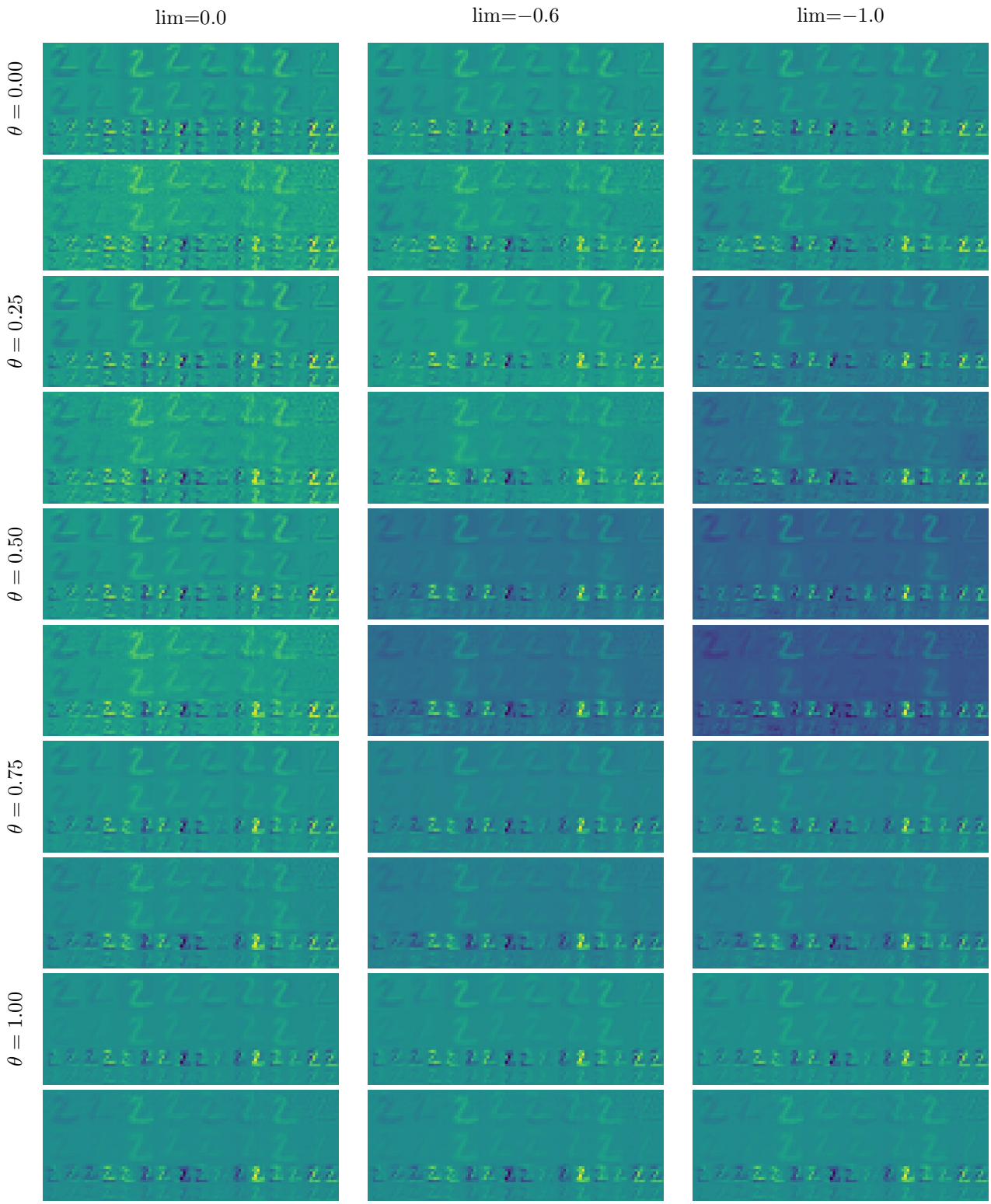

Figure 5: Learned features for clean and corrupted data. $T = 1$, $a_{div} = 1.0$

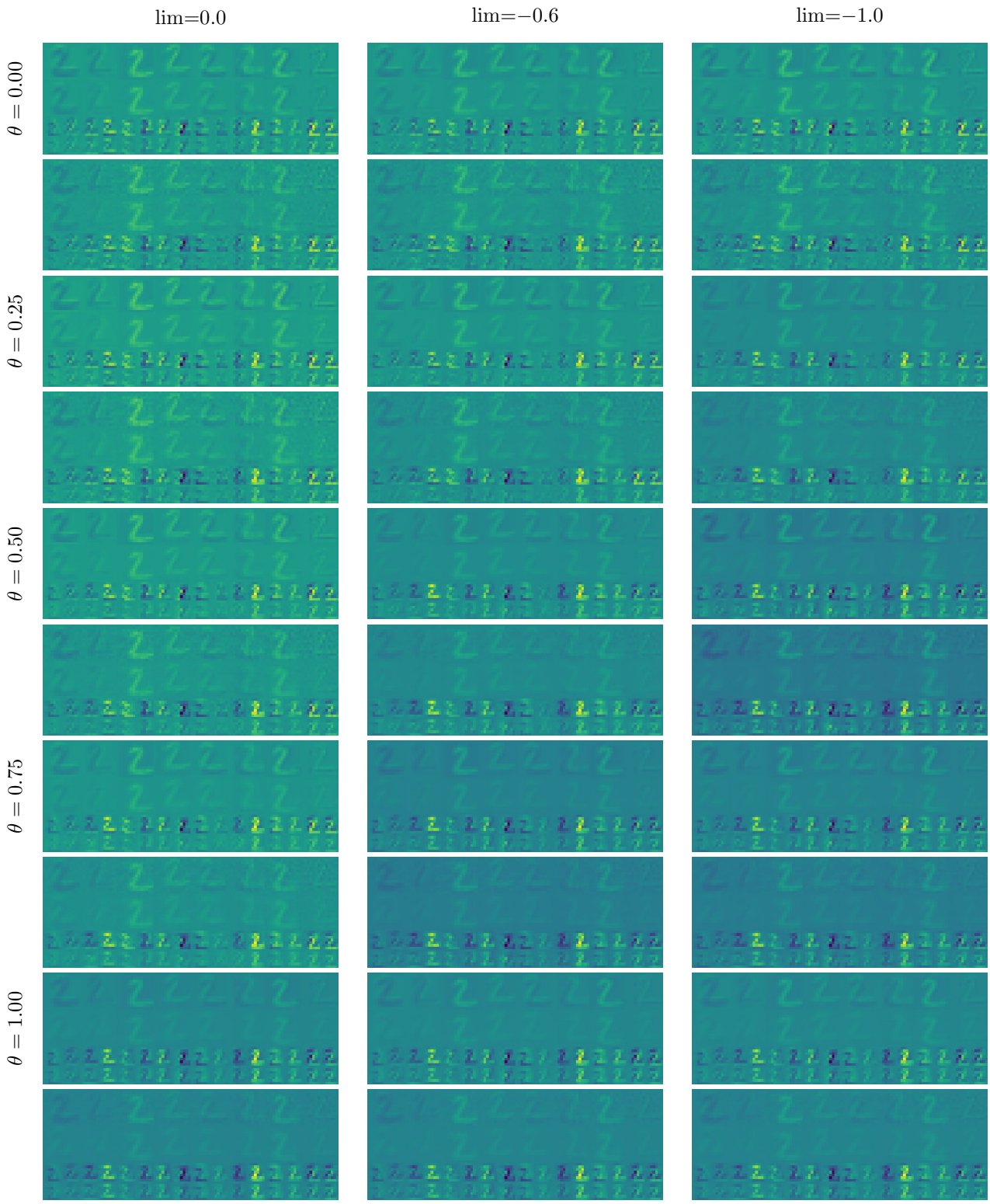

Figure 6: Learned features for clean and corrupted data. $T = 3$, $a_{div} = 1.0$