

SCALETESTING Dataset (Wavelet) - 2025-01-22

Dataset Description

- **Original source:** [Add source information here]
- **Sizes:** [Add size information here]
- **Image Type:** Laplace
- **Date range covered:** [Add date range here]
- **Number of Images (and channels):** [Add number of images here]
- **Representation:** Wavelet

Why did we choose it?

[Add reasons for choosing this dataset]

Cleaning - what did we do?

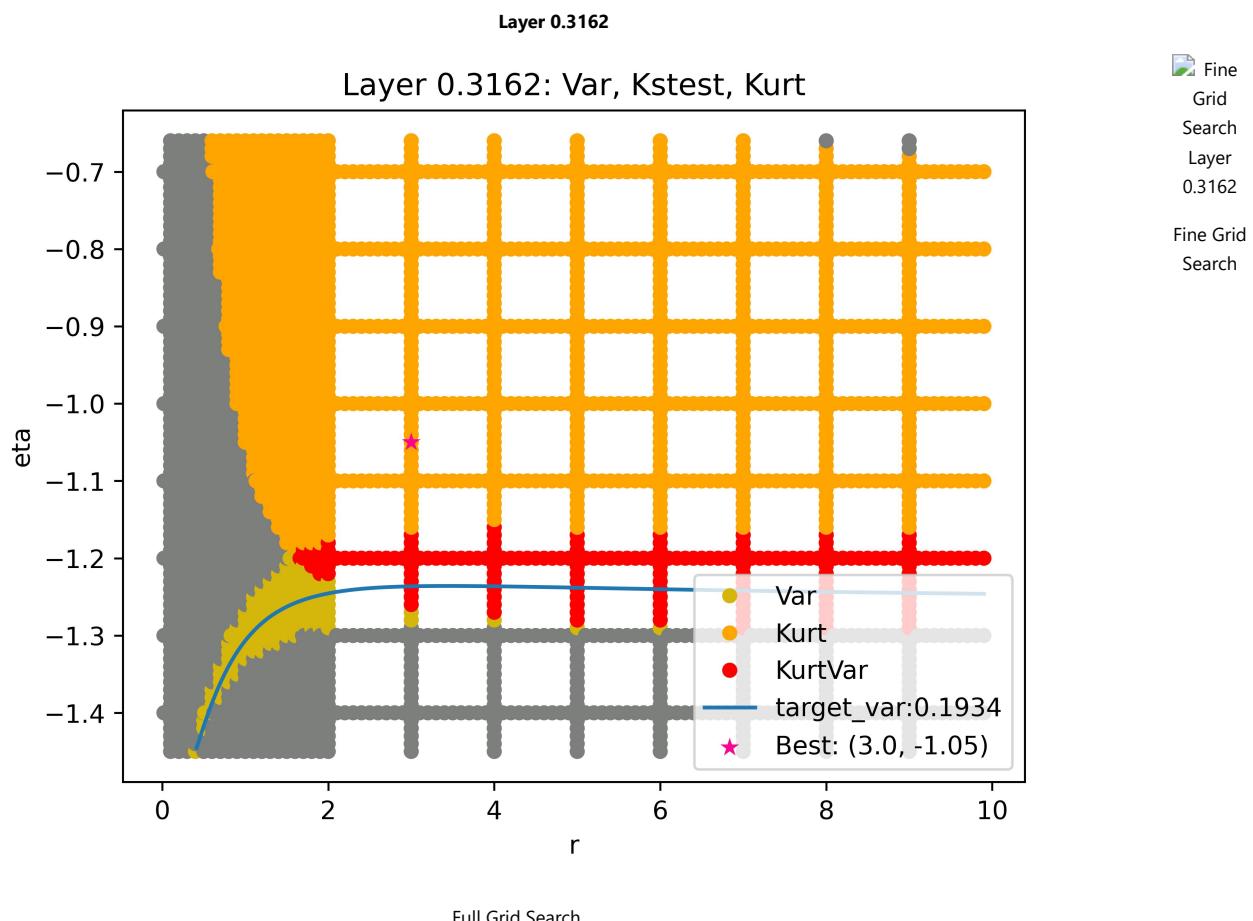
[Add cleaning process details]

Hypotheses

[Add hypotheses, basis/representation used, and assumptions about signal subsets]

Tests and Questions

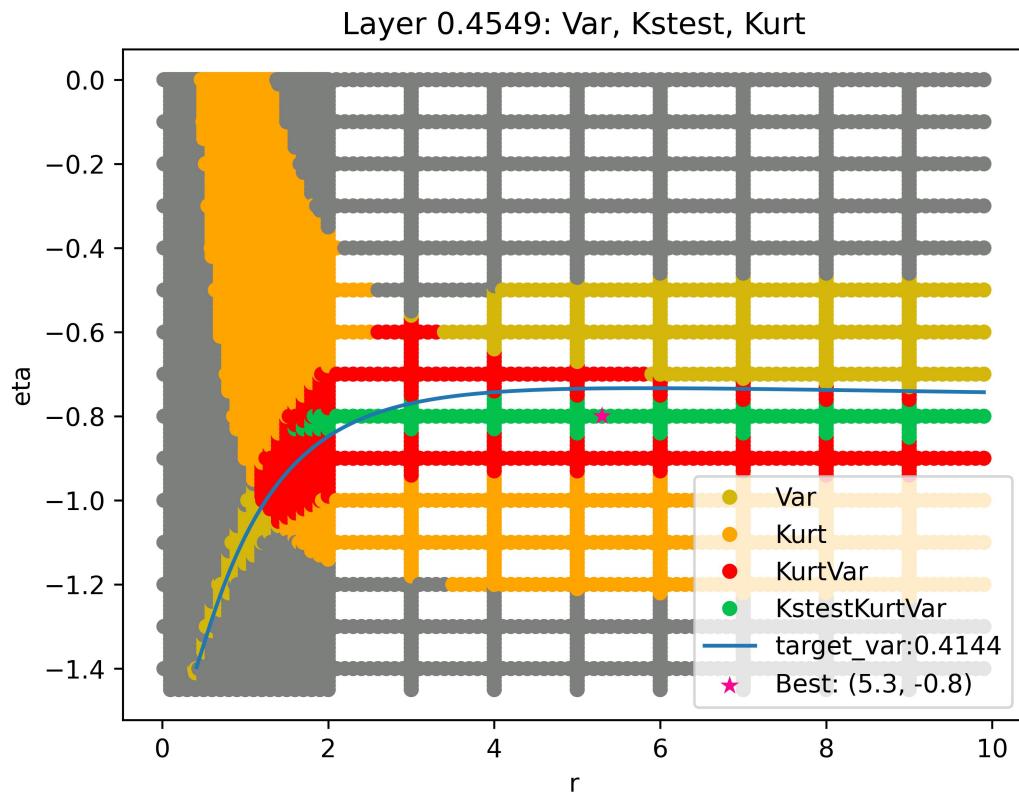
Full Grid Search Combo Plots



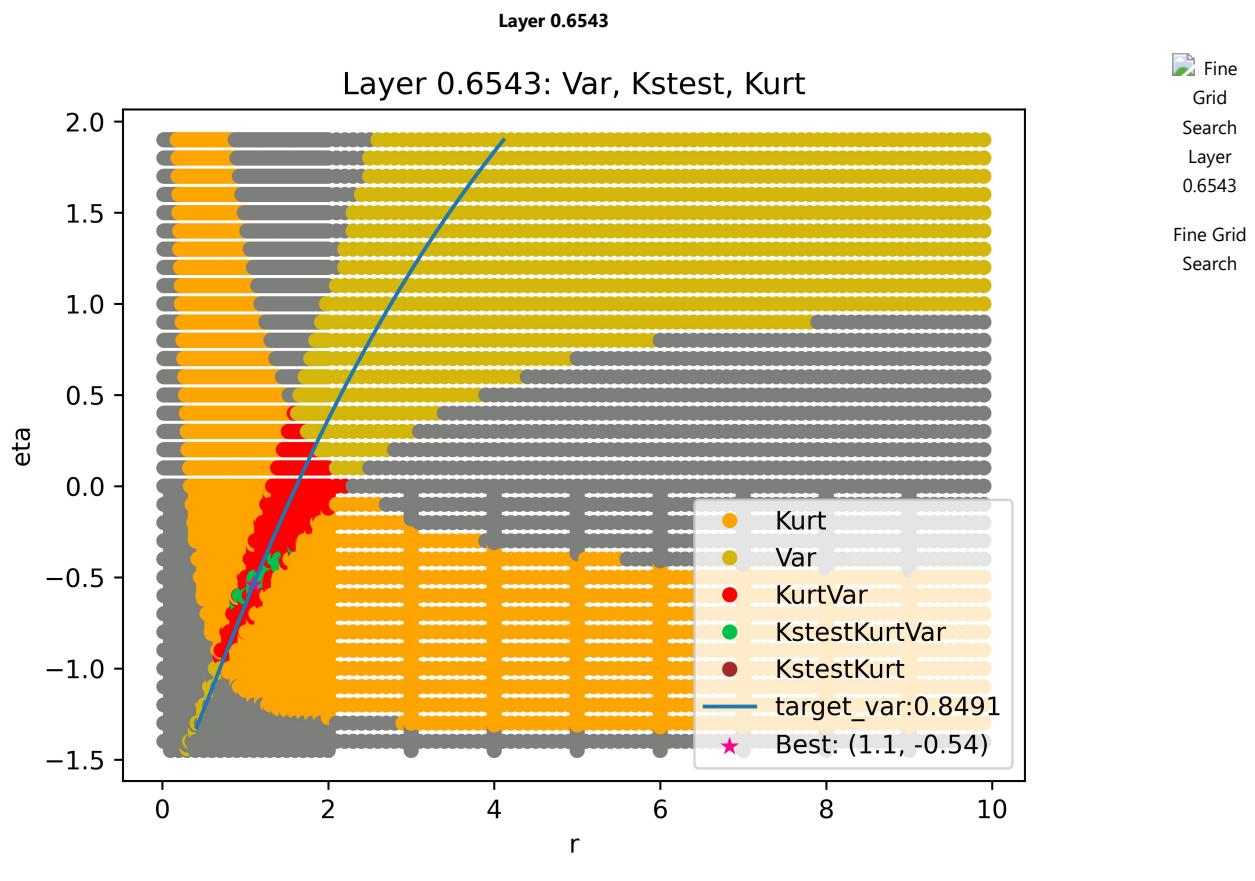
Layer 0.4549

Fine Grid Search Layer 0.4549

Fine Grid Search

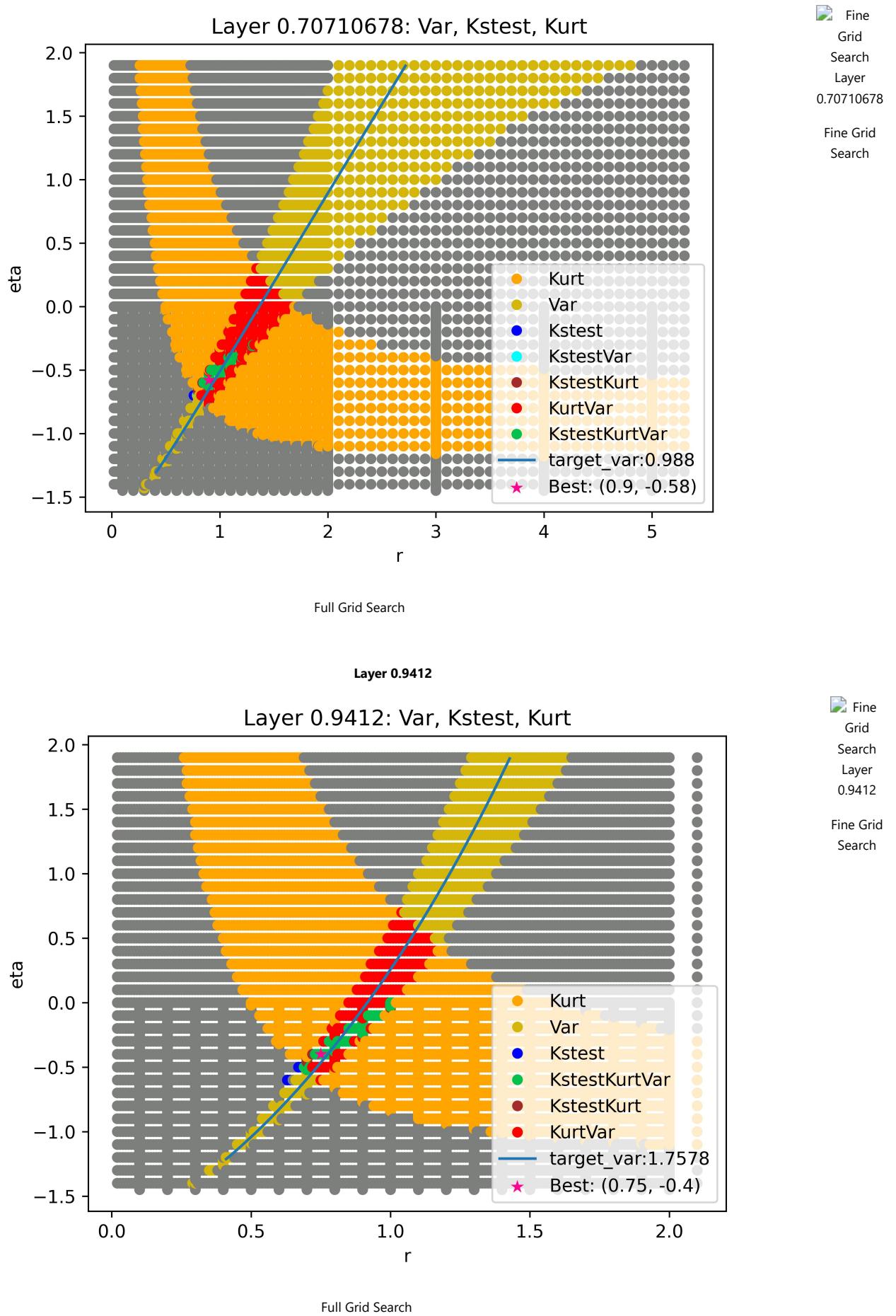


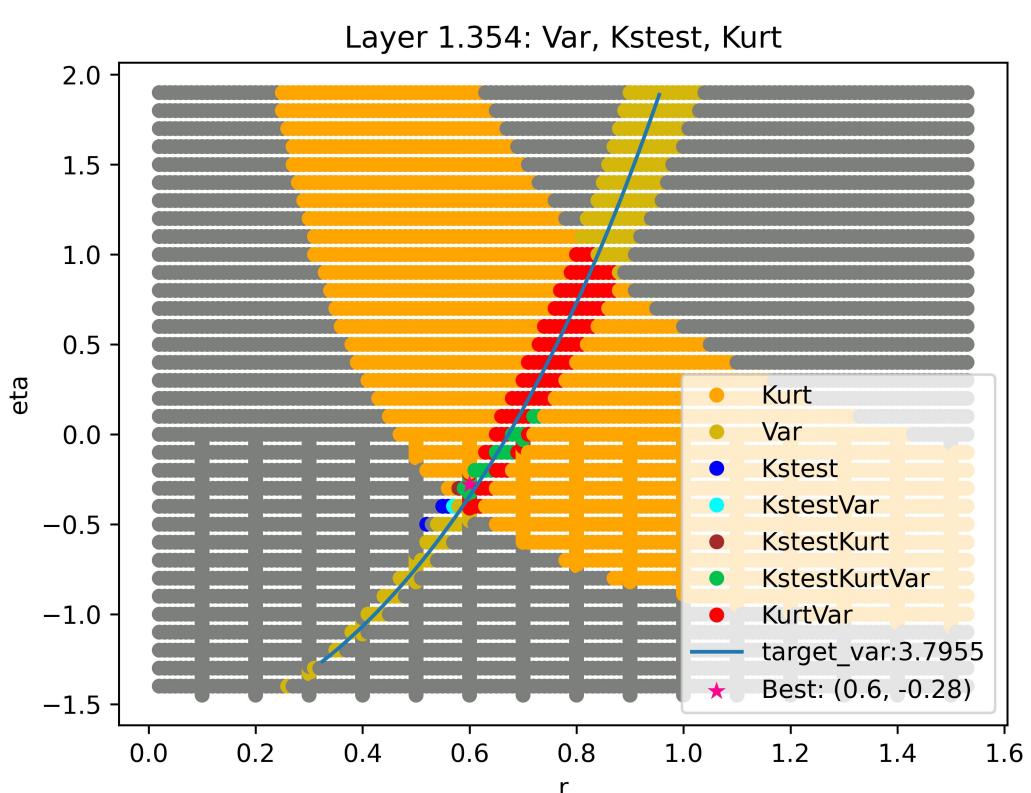
Full Grid Search



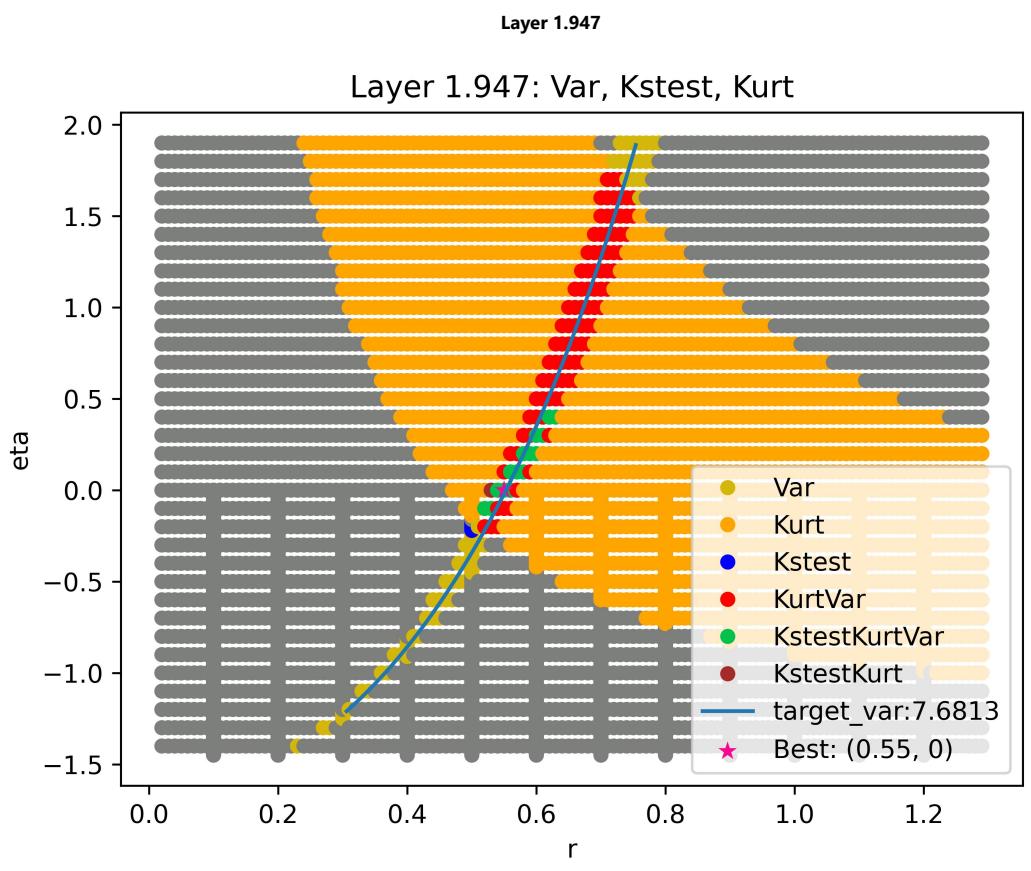
Full Grid Search

Layer 0.70710678



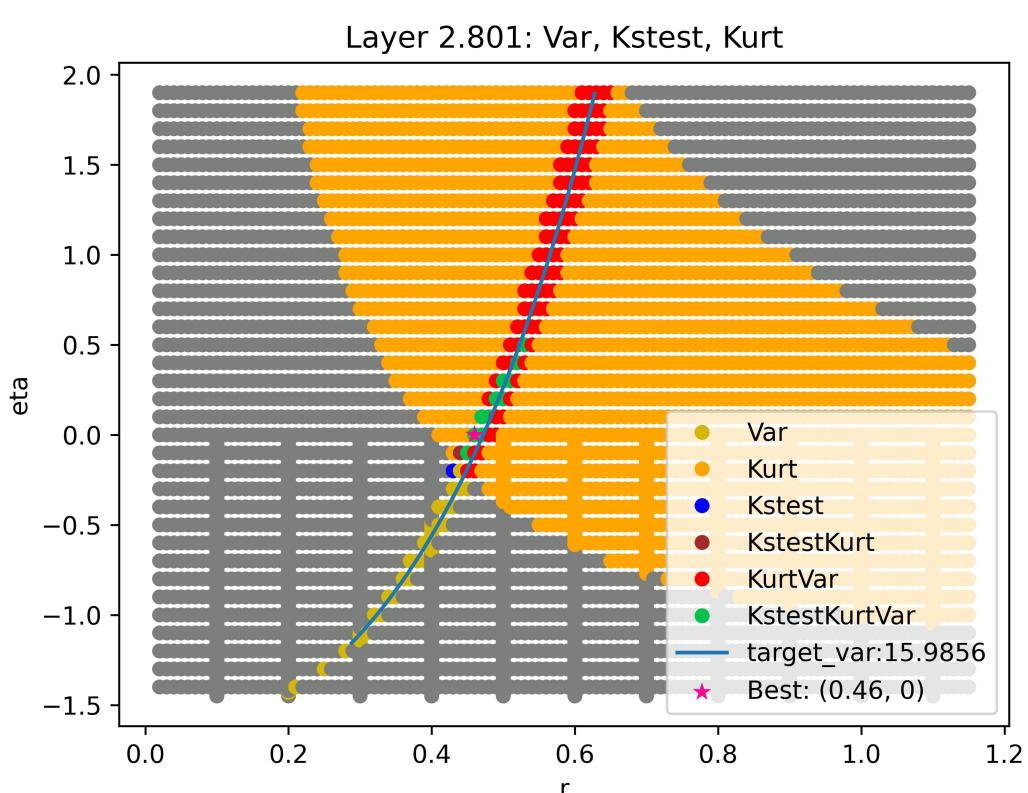


Full Grid Search

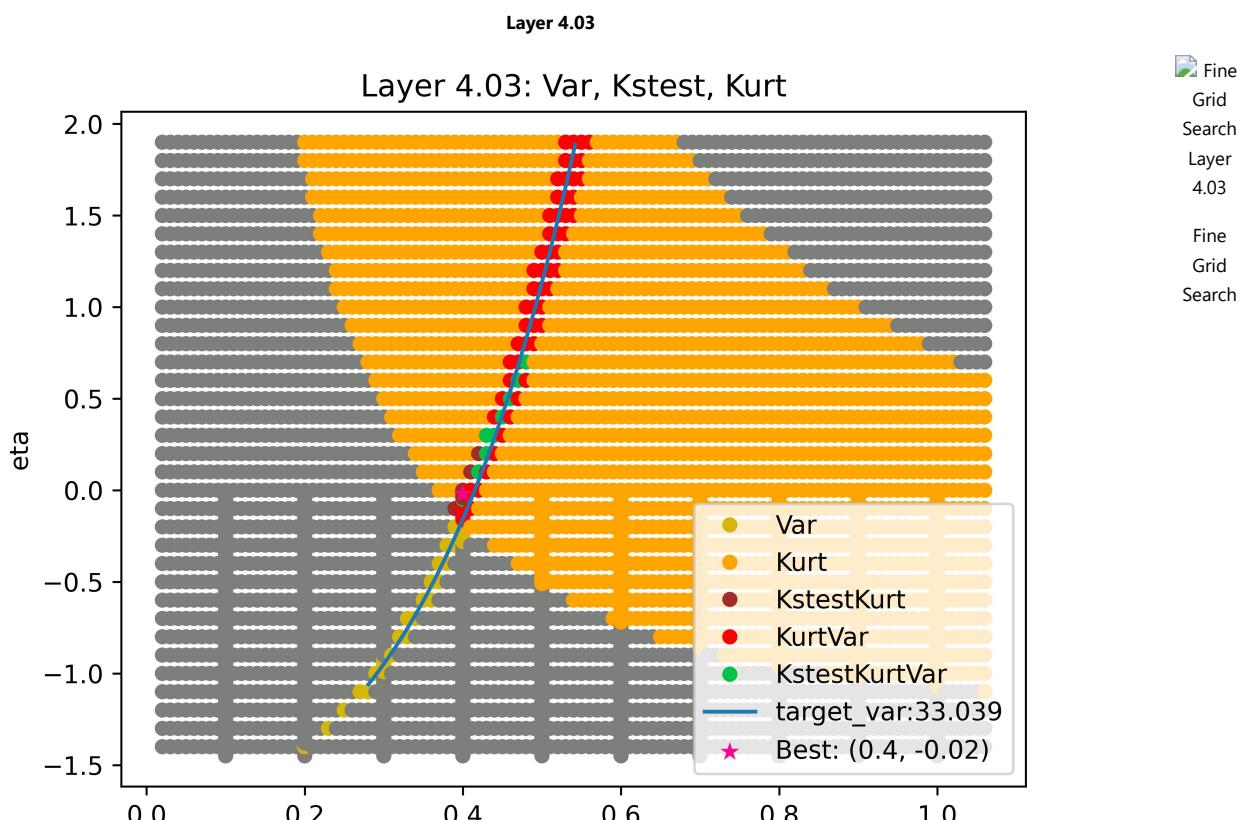


Full Grid Search

Layer 2.801

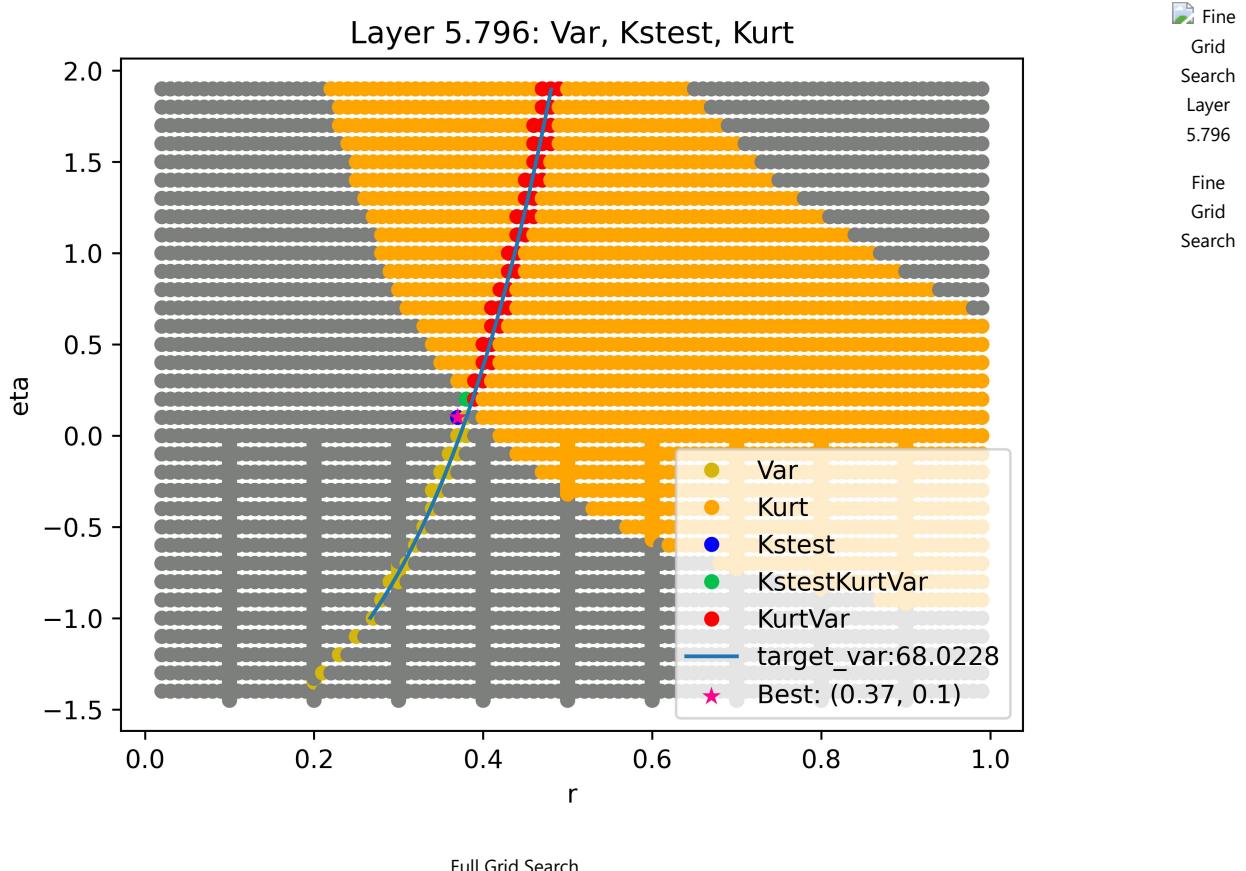


Full Grid Search

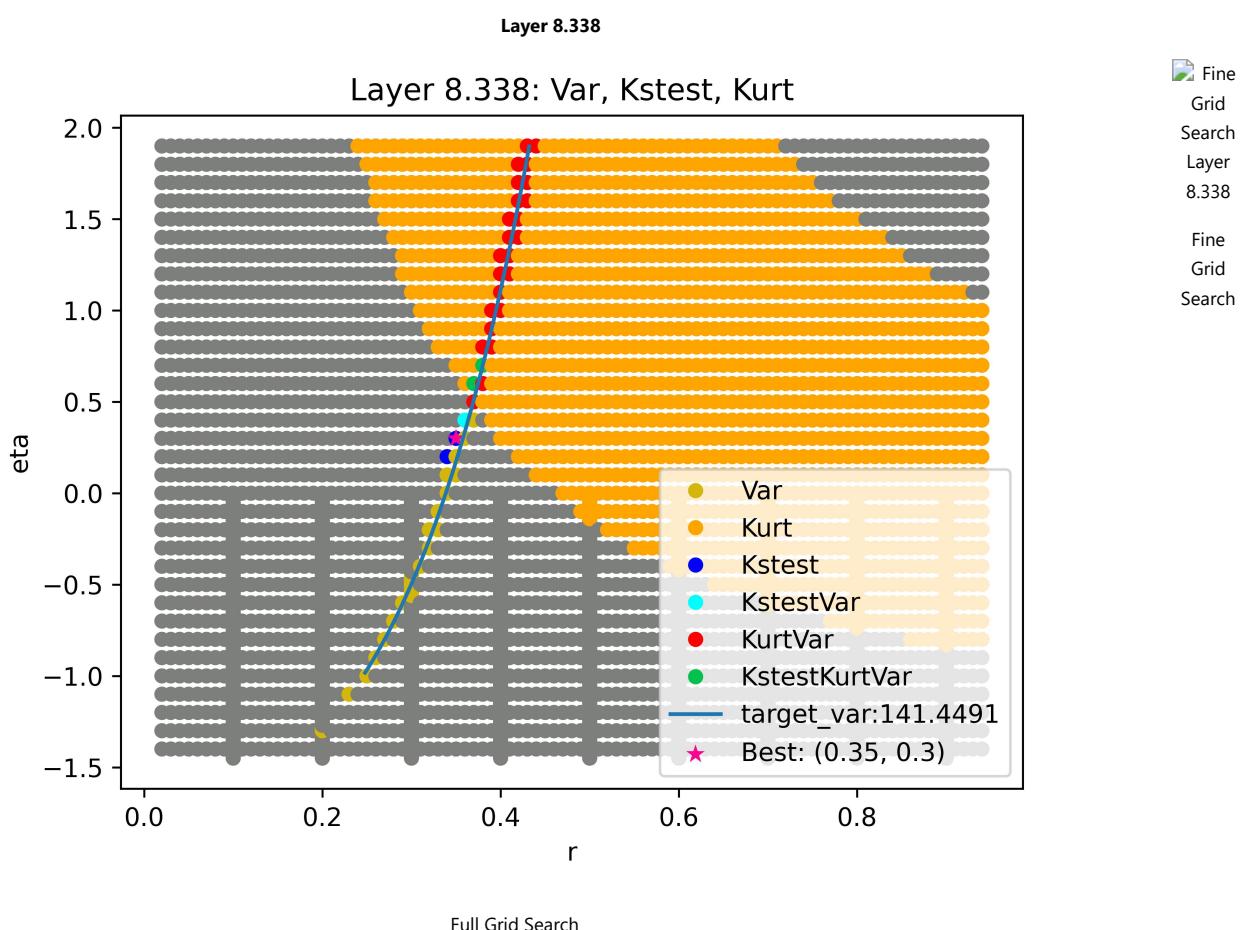


Full Grid Search

Layer 5.796

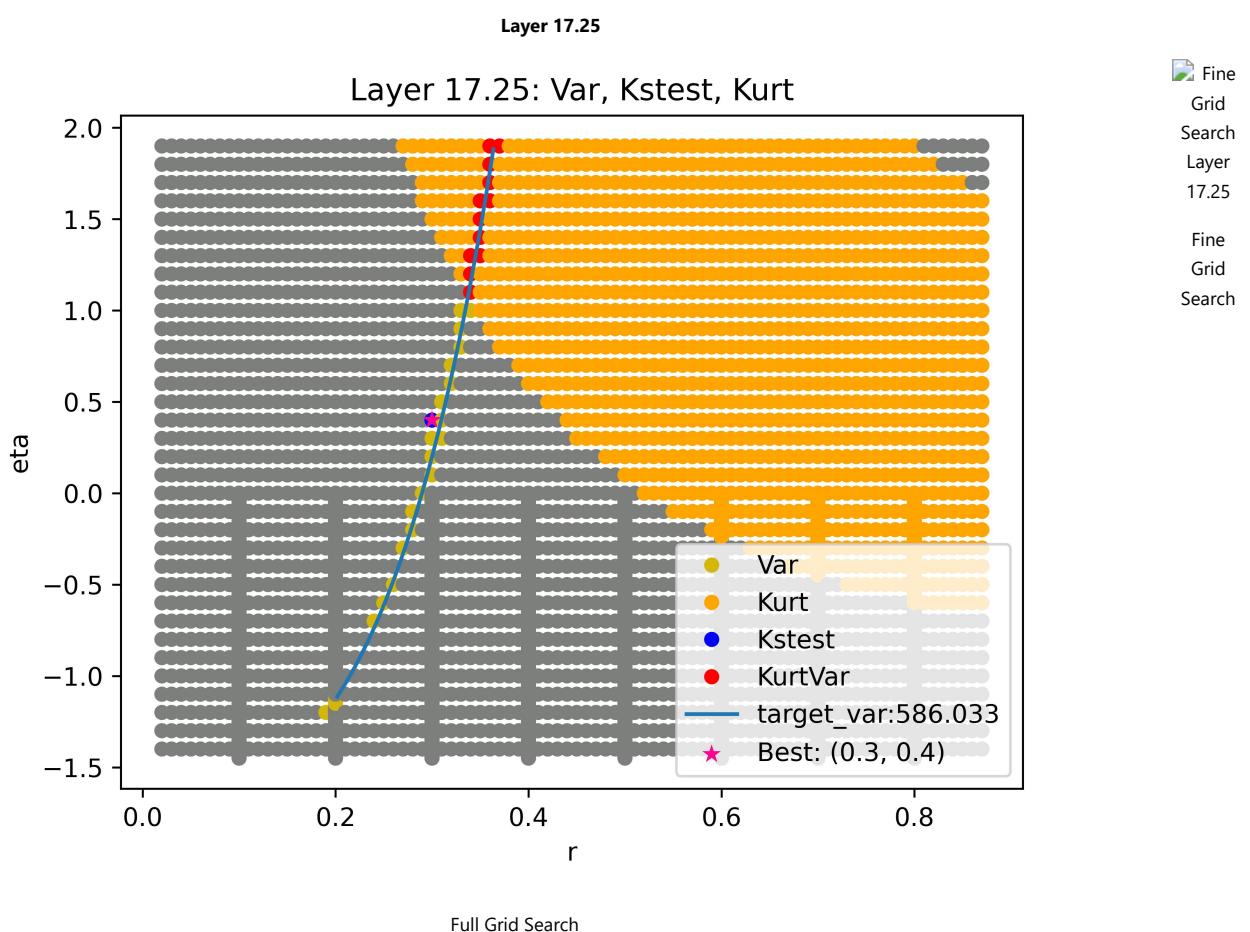
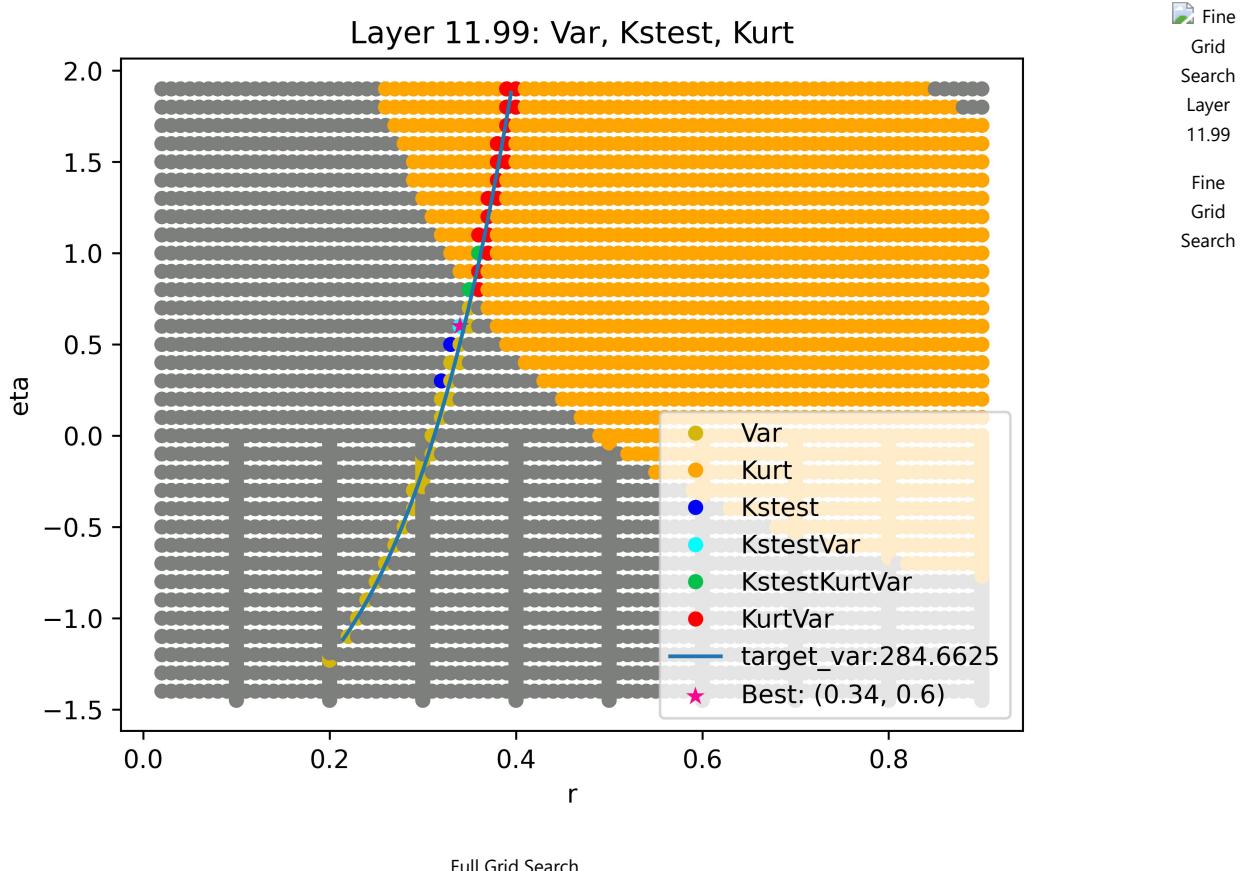


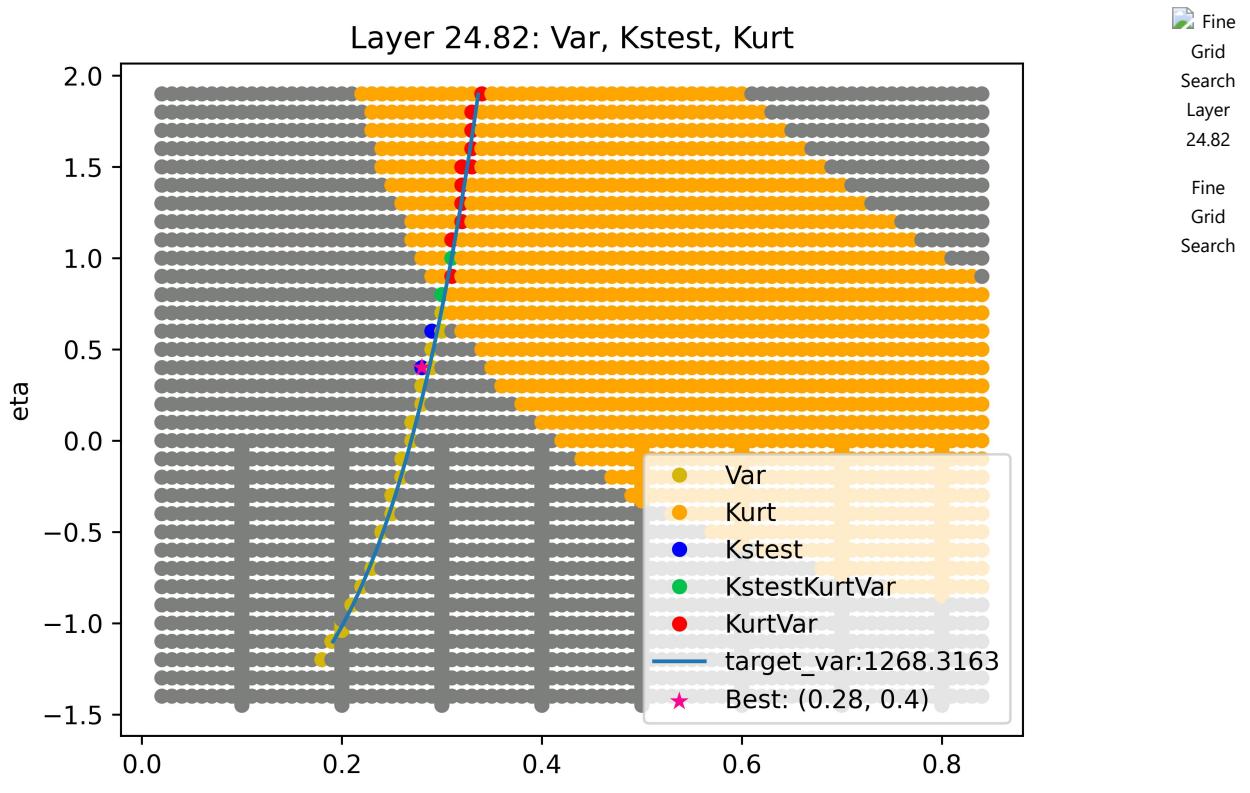
Full Grid Search



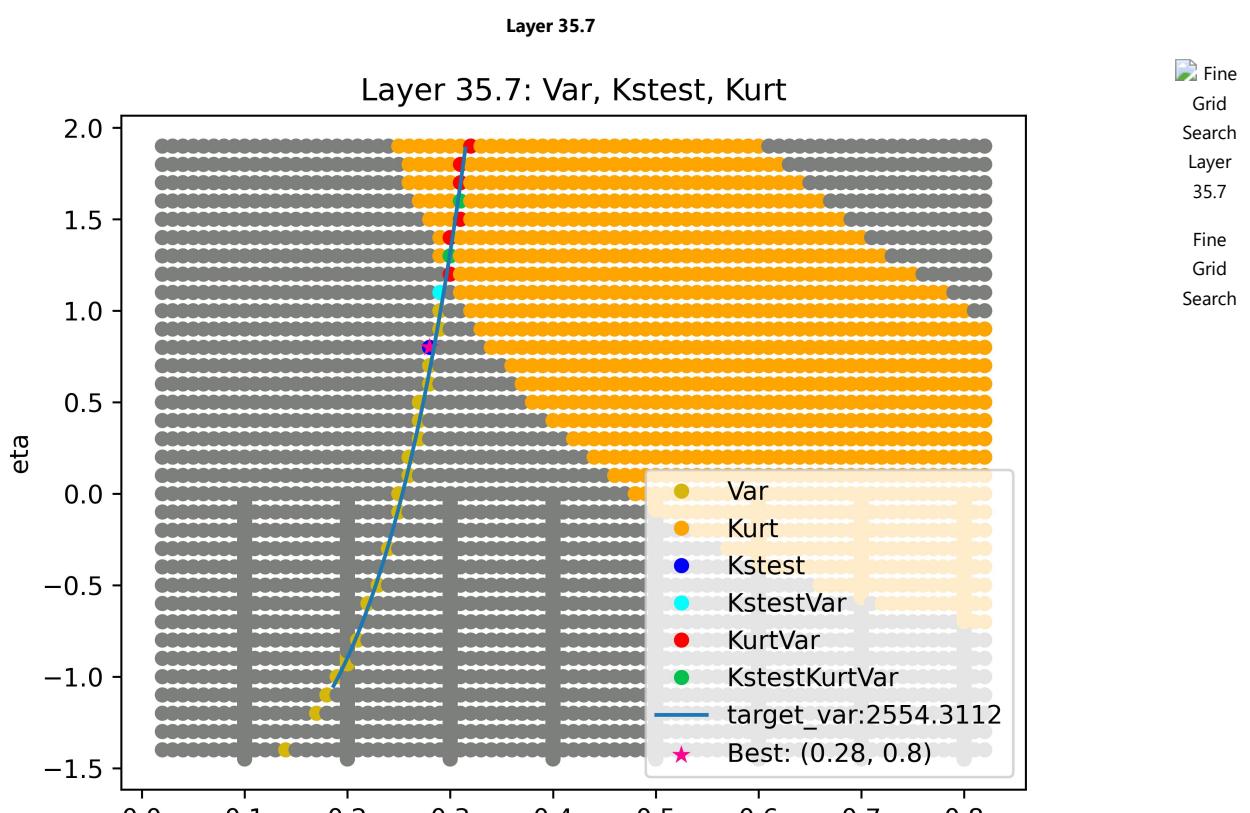
Full Grid Search

Layer 11.99



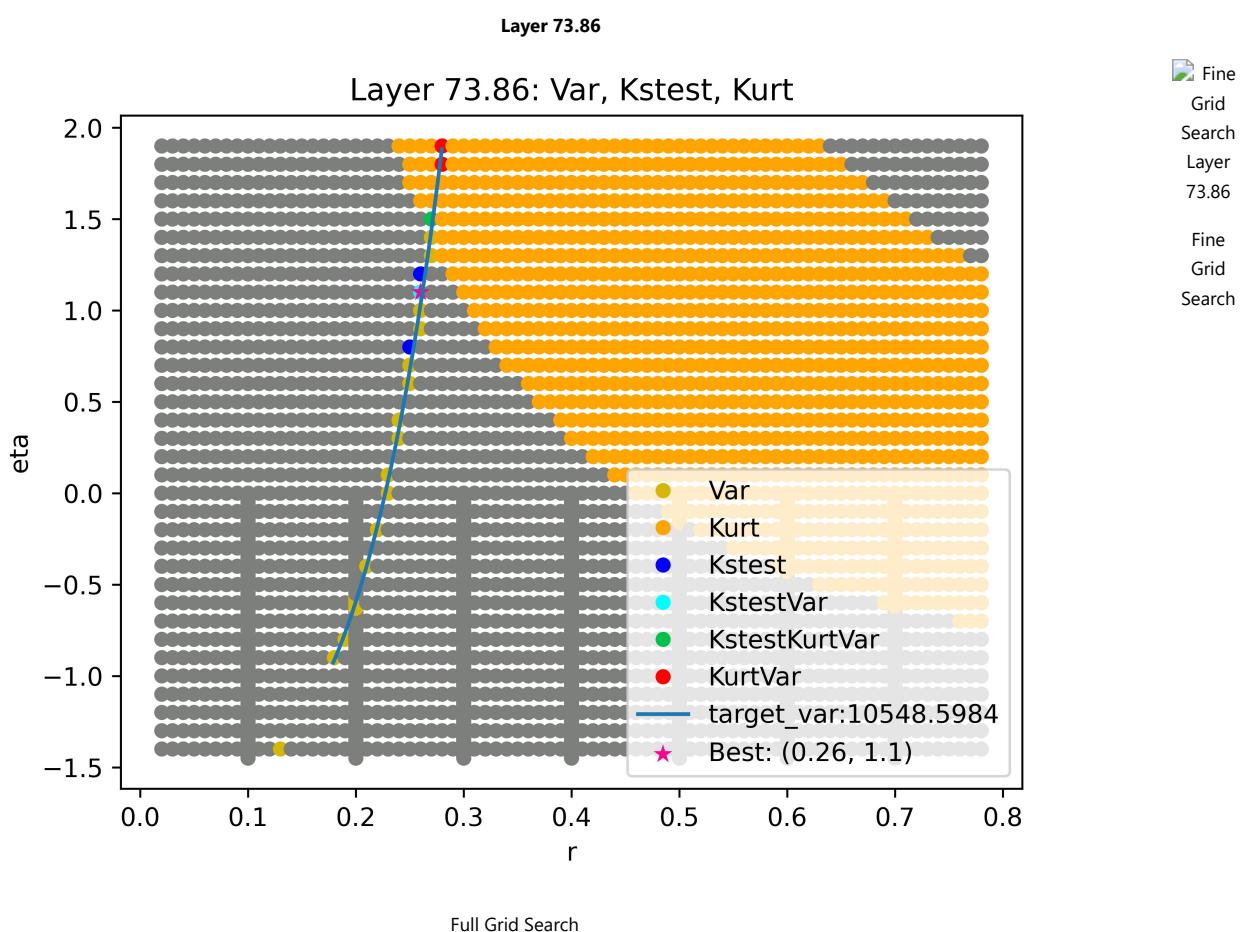
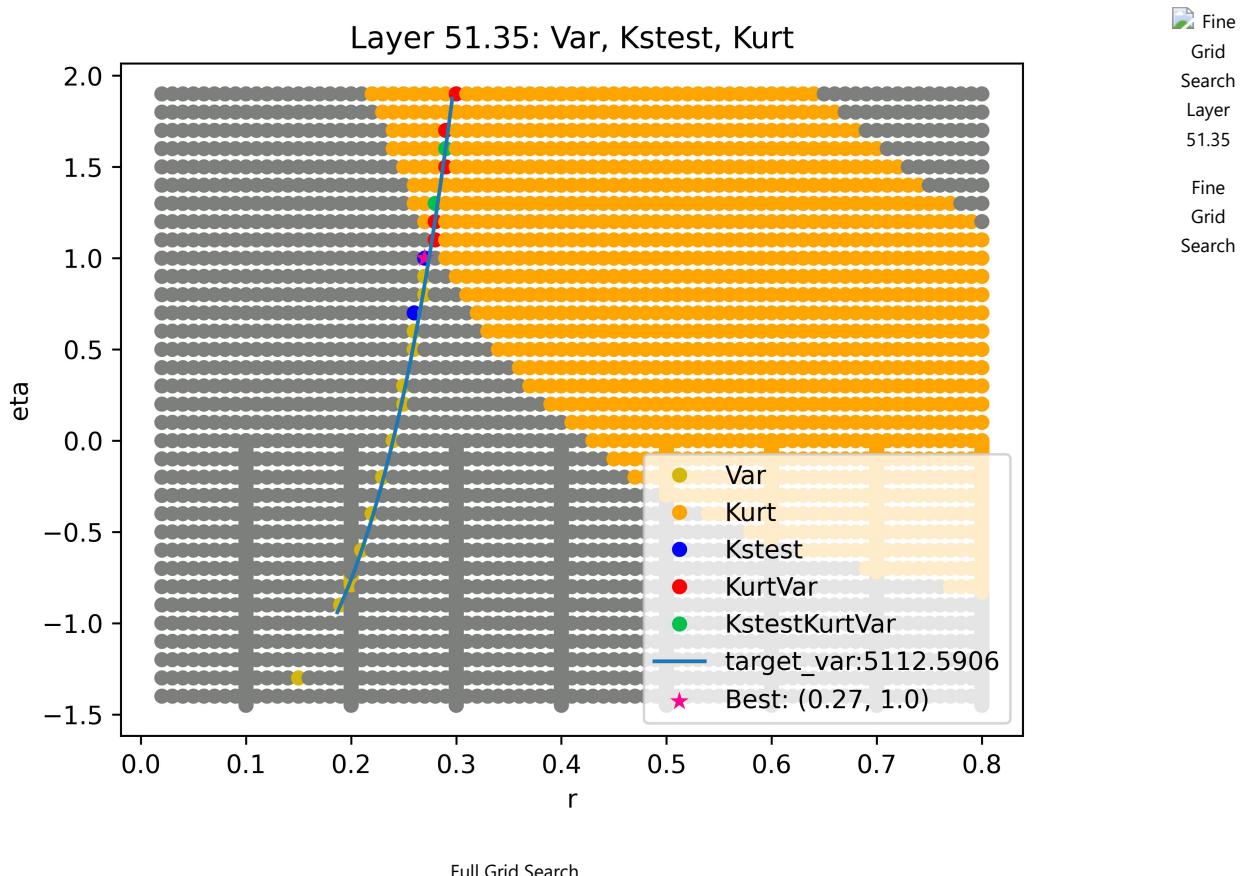


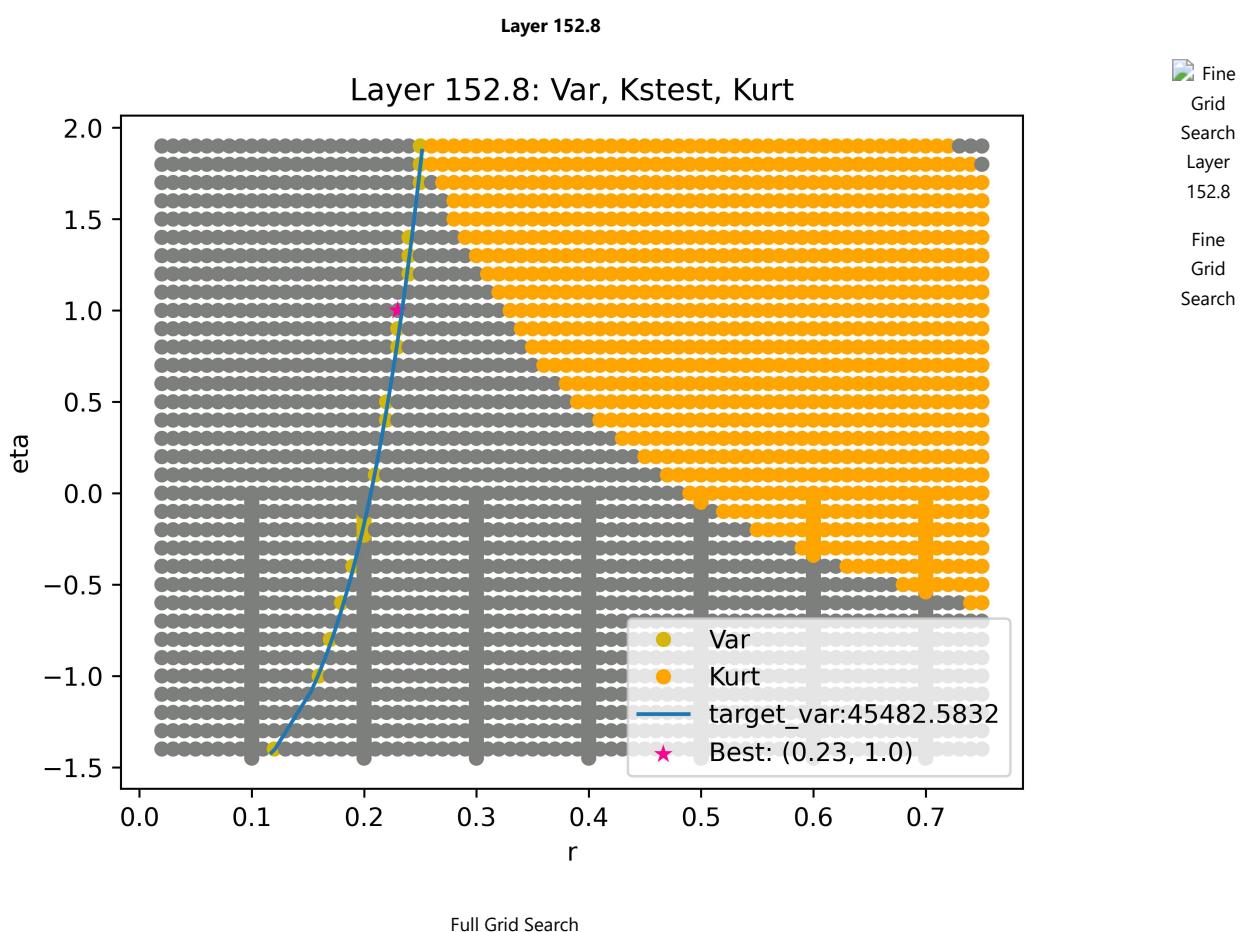
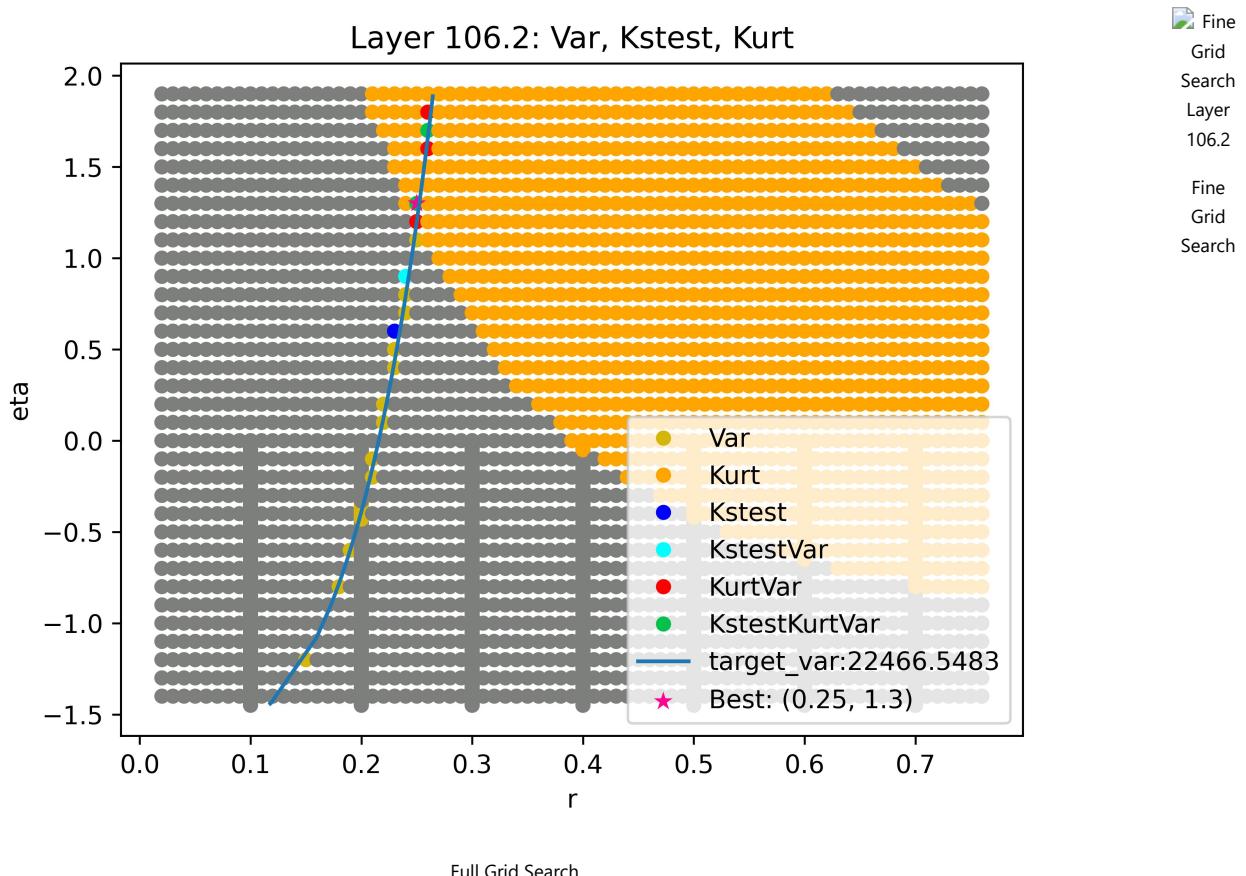
Full Grid Search

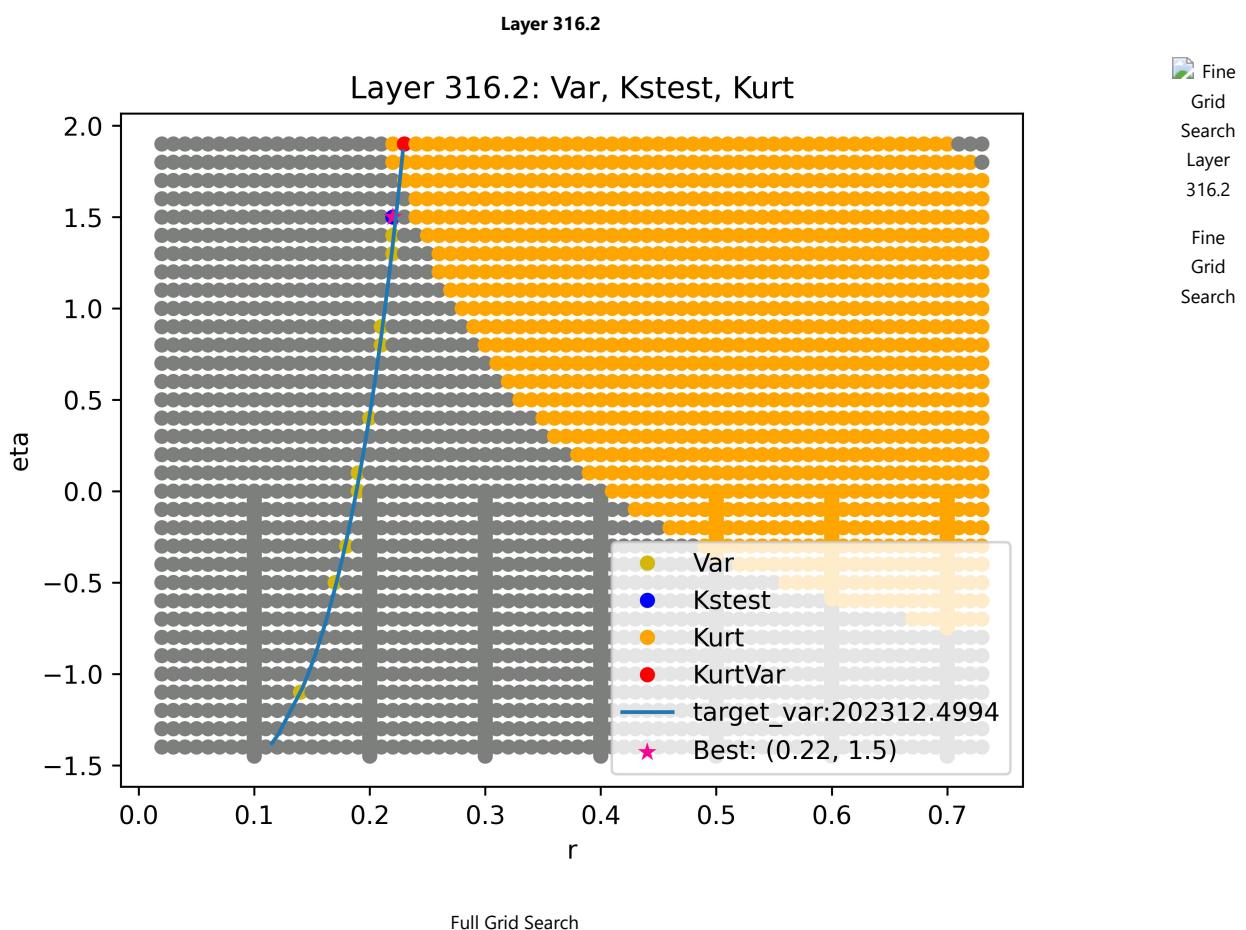
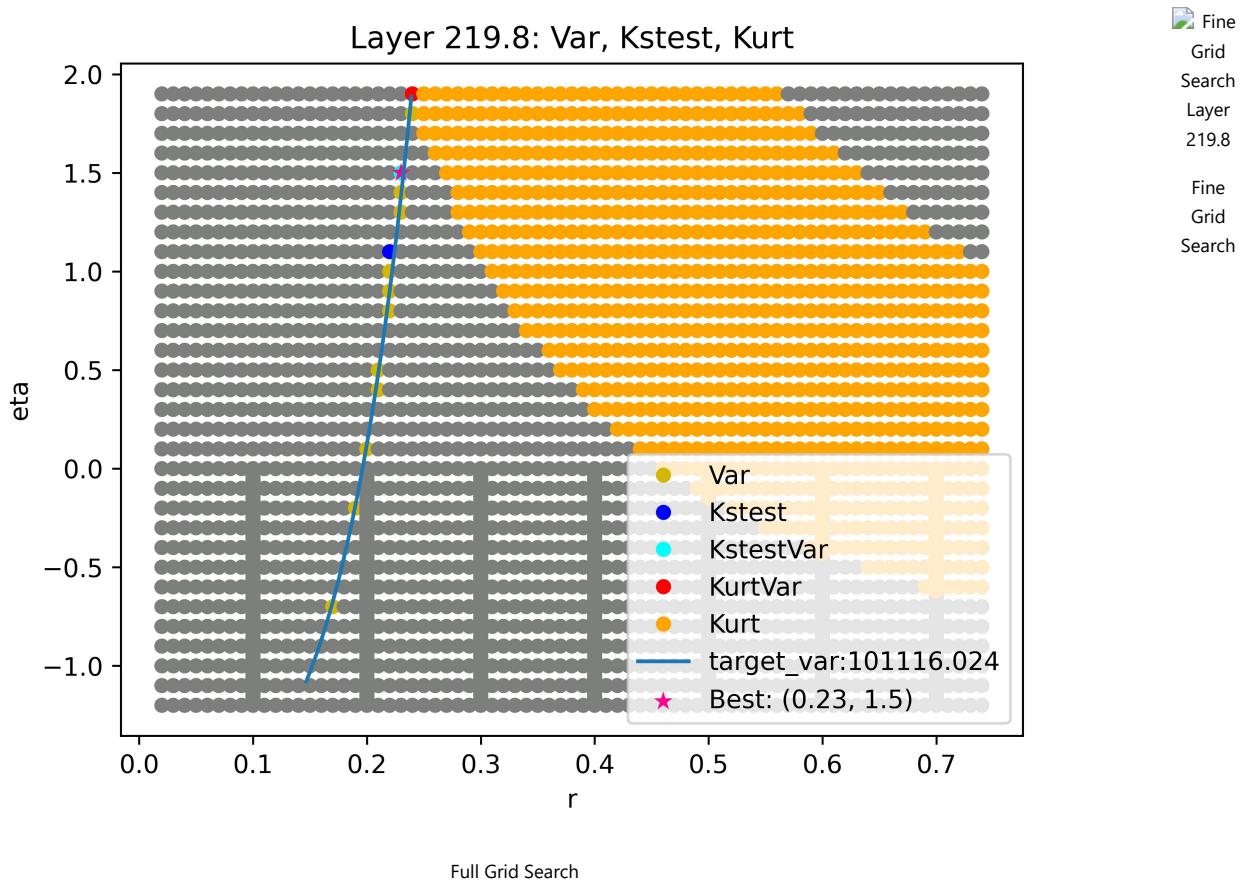


Full Grid Search

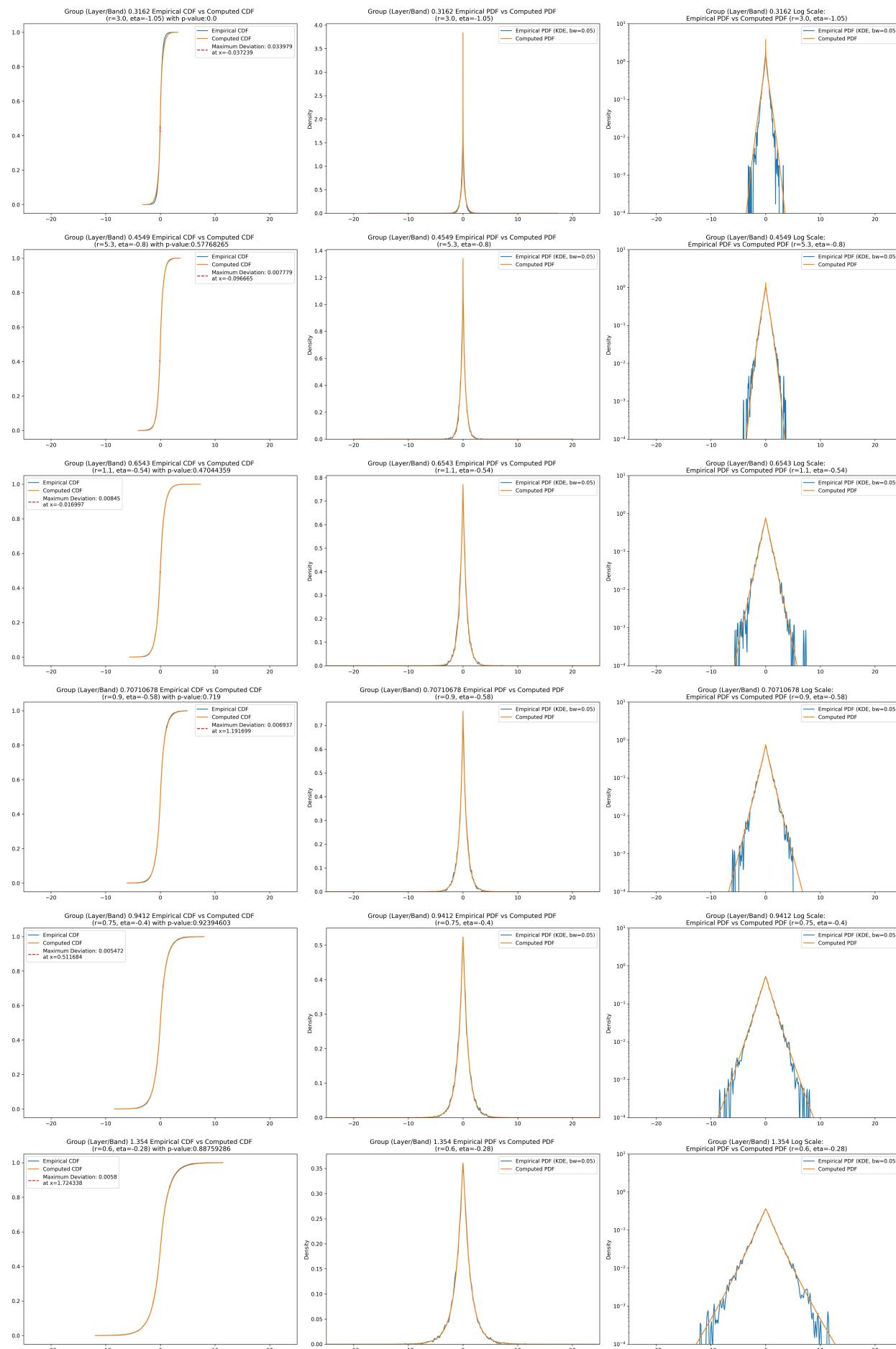
Layer 51.35

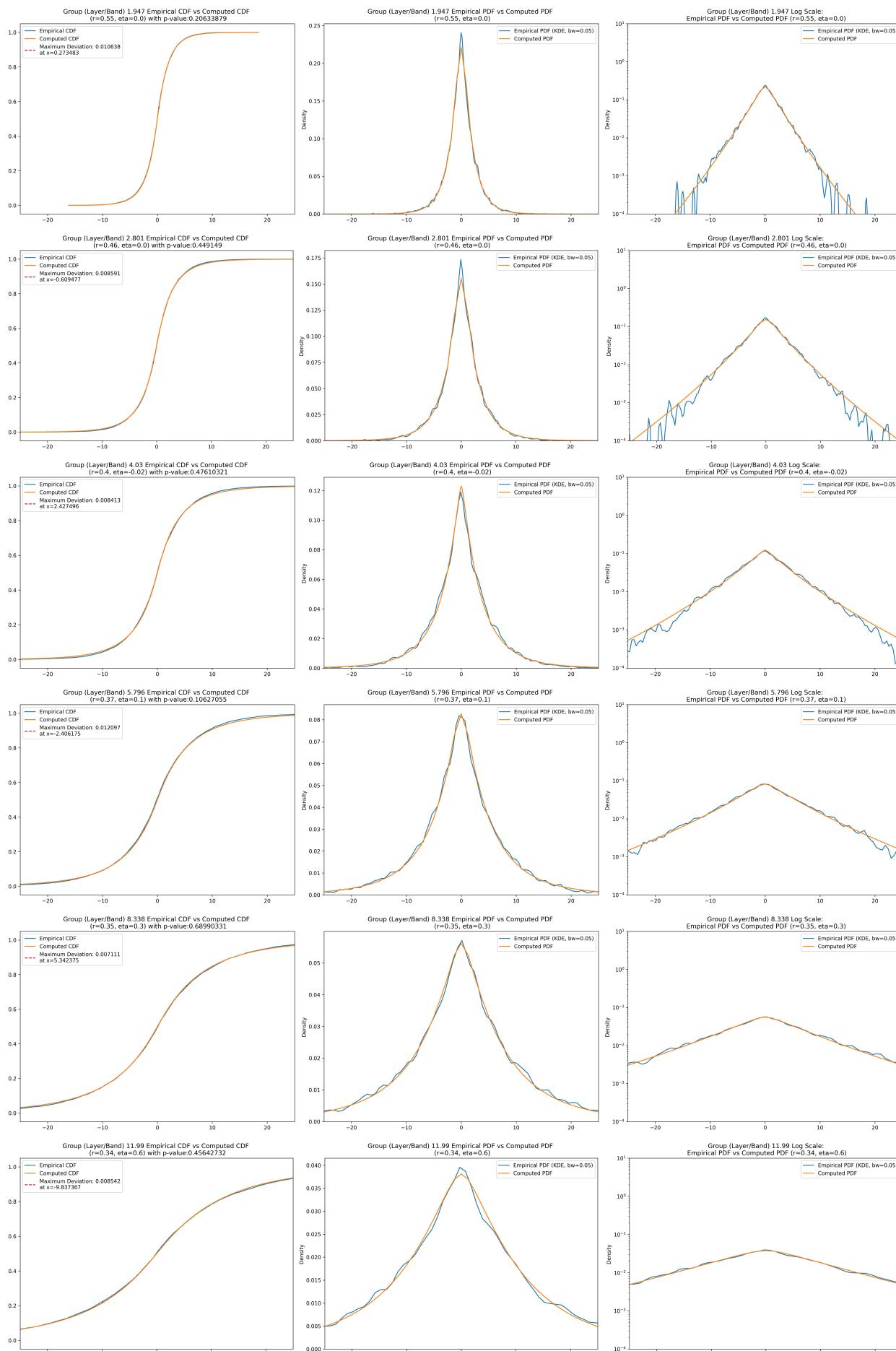


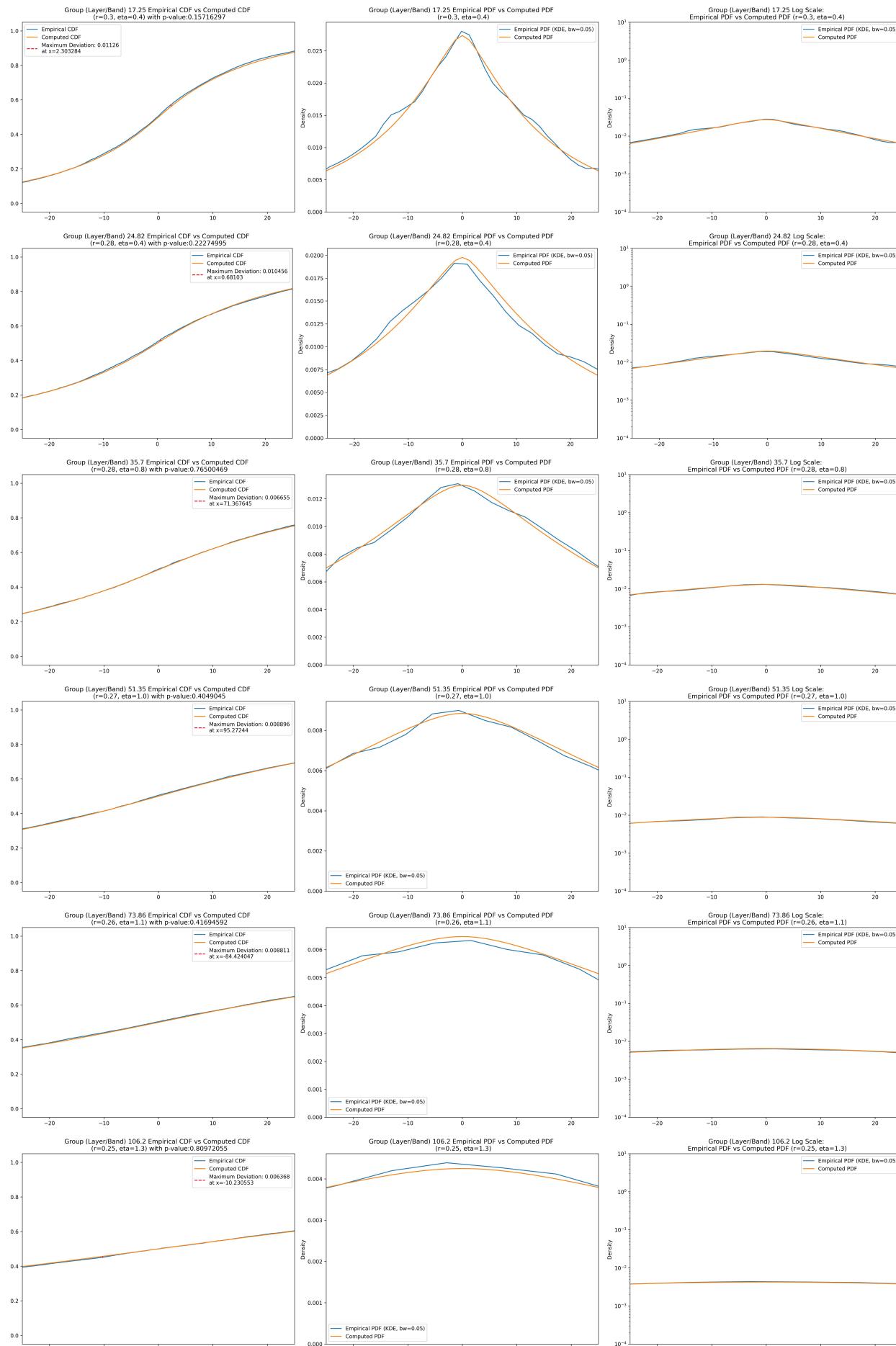


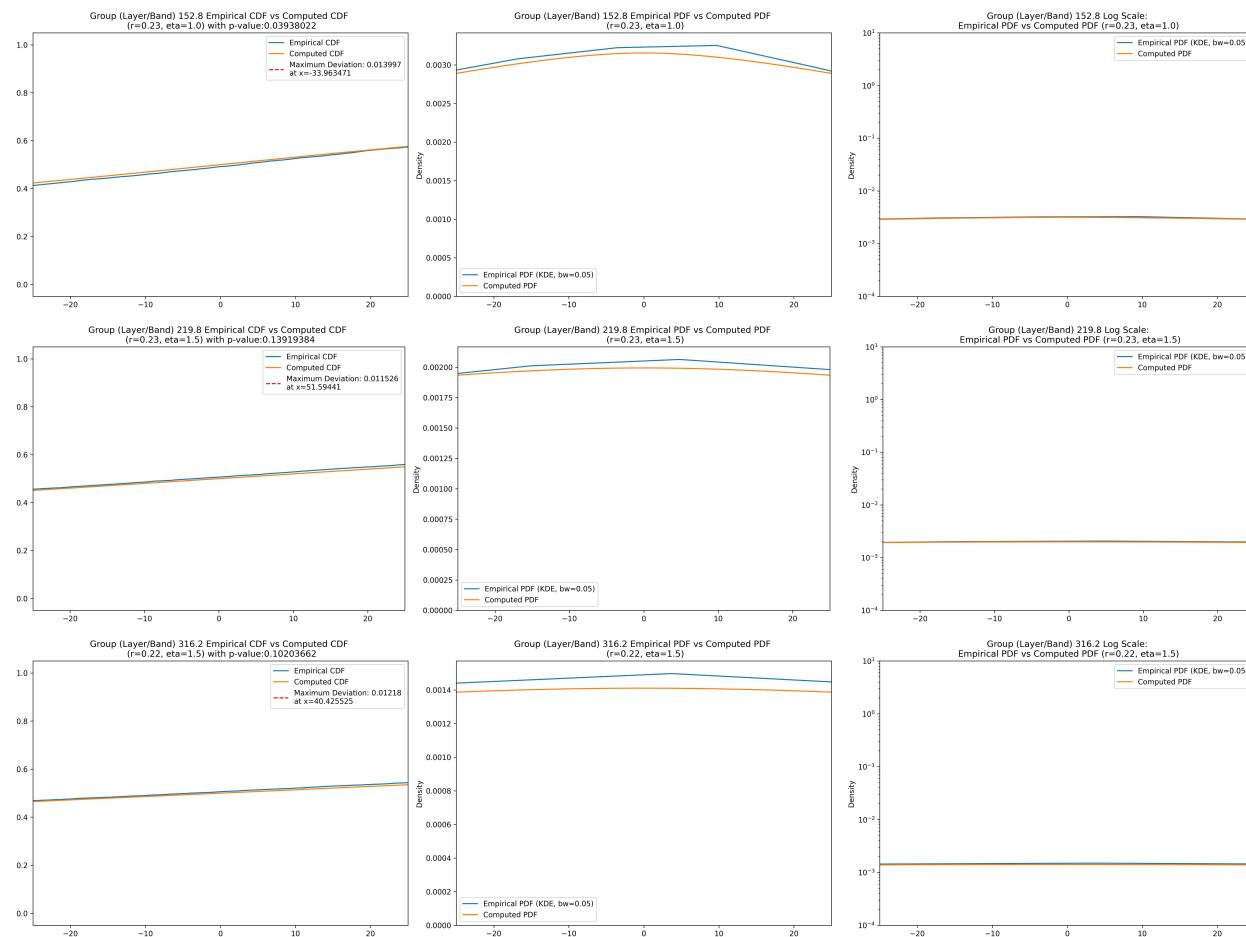


Compare CDF PDF Plots









Results

Best parameters from the proposed prior distribution:

layer	total_samples	best_r	best_eta	kstest_stat_best	kstest_stat_cutoff_0.05	n_pval_0.05
0.3162	10000	3	-1.05	0.033979	0.0135642	1579
0.4549	10000	5.3	-0.8	0.00777927	0.0135642	32035
0.6543	10000	1.1	-0.54	0.00844989	0.0135642	25312
0.707107	10000	0.9	-0.58	0.00693669	0.0135642	37968
0.9412	10000	0.75	-0.4	0.00547216	0.0135642	64071
1.354	10000	0.6	-0.28	0.00580007	0.0135642	56952
1.947	10000	0.55	0	0.00803188	0.0135642	28476
2.801	10000	0.46	0	0.0062251	0.0135642	48052
4.03	10000	0.4	-0.02	0.00841281	0.0135642	25312
5.796	10000	0.37	0.1	0.0121615	0.0135642	12655
8.338	10000	0.35	0.3	0.00711153	0.0135642	37968
11.99	10000	0.34	0.6	0.0085422	0.0135642	25312
17.25	10000	0.3	0.4	0.0112606	0.0135642	15000
24.82	10000	0.28	0.4	0.0104491	0.0135642	16875
35.7	10000	0.28	0.8	0.00665483	0.0135642	42714
51.35	10000	0.27	1	0.00889602	0.0135642	22500
73.86	10000	0.26	1.1	0.00881114	0.0135642	24025
106.2	10000	0.25	1.3	0.00636754	0.0135642	48052
152.8	10000	0.23	1	0.0139968	0.0135642	9490
219.8	10000	0.23	1.5	0.011526	0.0135642	14236
316.2	10000	0.22	1.5	0.0121805	0.0135642	12655

Optimization progression:

layer	initial_r	initial_eta	best_r	best_eta
0.3162	3	-1.05	3	-1.05
0.4549	5.3	-0.8	5.3	-0.8
0.6543	1.1	-0.54	1.1	-0.54
0.707107	0.9	-0.58	0.9	-0.58
0.9412	0.75	-0.4	0.75	-0.4
1.354	0.6	-0.28	0.6	-0.28
1.947	0.55	0	0.55	0
2.801	0.46	0	0.46	0
4.03	0.4	-0.02	0.4	-0.02
5.796	0.37	0.1	0.37	0.1
8.338	0.35	0.3	0.35	0.3
11.99	0.34	0.6	0.34	0.6
17.25	0.3	0.4	0.3	0.4
24.82	0.28	0.4	0.28	0.4
35.7	0.28	0.8	0.28	0.8
51.35	0.27	1	0.27	1
73.86	0.26	1.1	0.26	1.1
106.2	0.25	1.3	0.25	1.3
152.8	0.23	1	0.23	1
219.8	0.23	1.5	0.23	1.5
316.2	0.22	1.5	0.22	1.5

Parameter comparisons with other common priors (Gaussian, Laplace, Student t):

layer	ktest_stat_initial	ktest_stat_cutoff_0.05	ktest_stat_best	param_gaussian	ktest_stat_gaussian	param_laplace	ktest_stat_laplace	pa
0.3162	0.033979	0.0135642	0.033979	0.347438	0.0352987	0.311688	0.0127237	0.2
0.4549	0.00777927	0.0135642	0.00777927	0.512904	0.0317295	0.451292	0.00492702	0.3
0.6543	0.00844989	0.0135642	0.00844989	0.73836	0.0330501	0.657415	0.0082615	0.5
0.707107	0.00693669	0.0135642	0.00693669	0.802647	0.0330755	0.703243	0.00699927	0.5
0.9412	0.00547216	0.0135642	0.00547216	1.06066	0.0308783	0.938017	0.00547748	0.7
1.354	0.00580007	0.0135642	0.00580007	1.54811	0.0335358	1.35016	0.0059721	1.
1.947	0.00803188	0.0135642	0.00803188	2.22411	0.0307615	2.00008	0.00692442	1.
2.801	0.0062251	0.0135642	0.0062251	3.20118	0.0316908	2.8041	0.00614727	2.
4.03	0.00841281	0.0135642	0.00841281	4.59762	0.0312872	4.01158	0.00571498	3.
5.796	0.0121615	0.0135642	0.0121615	6.51105	0.0356562	5.69695	0.0124842	4.
8.338	0.00711153	0.0135642	0.00711153	9.55305	0.0323751	8.36585	0.00643807	6.
11.99	0.0085422	0.0135642	0.0085422	13.9096	0.0304379	12.0506	0.00556144	9.
17.25	0.0112606	0.0135642	0.0112606	19.4895	0.0339346	17.1955	0.0100796	1.
24.82	0.0104491	0.0135642	0.0104491	28.0765	0.0320928	24.2191	0.0100361	20.
35.7	0.00665483	0.0135642	0.00665483	40.3167	0.0305511	35.3679	0.00593353	29.
51.35	0.00889602	0.0135642	0.00889602	57.9395	0.0282033	51.4107	0.00677026	41.
73.86	0.00881114	0.0135642	0.00881114	81.4778	0.0312662	72.8265	0.00646257	55.
106.2	0.00636754	0.0135642	0.00636754	120.371	0.0303903	105.353	0.00460324	81.
152.8	0.0139968	0.0135642	0.0139968	166.96	0.0360286	145.157	0.0112897	11.
219.8	0.011526	0.0135642	0.011526	252.558	0.0329186	227.647	0.00925284	18.
316.2	0.0121805	0.0135642	0.0121805	361.056	0.0304582	317.504	0.00868066	21.

All the columns you can access:

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['obs_var', 'var_lower', 'var_upper', 'obs_kurt', 'kurt_lower', 'kurt_upper', 'total_samples', 'initial_r', 'initial_eta', 'kstest_stat_initial', 'kstest_stat_cutoff_0.05', 'best_r_eta0', 'kstest_stat_eta0', 'kstest_stat_best', 'best_r', 'best_eta', 'n_pval_0.05', 'param_gaussian', 'kstest_stat_gaussian', 'kstest_pval_gaussian', 'param_laplace', 'kstest_stat_laplace', 'kstest_pval_laplace', 'param_t', 'kstest_stat_t', 'kstest_pval_t', 'kstest_pval_gengamma']
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Major Take-aways

[Add major conclusions and insights]