CUT FLOW TABLES FOR SUS-15-005: UPDATES AND PLANS

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MOTIVATION

- Cut flow tables are required for SUSY analyses.
- It helps in understanding data/MC – we can see if there are anomalies present in the results from trigger cuts/other event selections. It is also possible to pinpoint excesses of events by comparing the expected vs. observed number of events (hints of new particles?).
- Motivation for me to learn cmgtools and AlphaTools so I can contribute to future work.

CURRENT PROGRESS

- Code to create cut flow tables is present in AlphaTools: pulled v1.9.x, development on branch v1.6.12_Approval_151210_cutflow. Written by Dom, I've mainly been running the scripts to produce the tables and understanding the code, as of late.
- Example cut flow tables for Signal Data – located in /hdfs/SUSY/RA1/74X/Data/20151202_D01/20151202_run_susyAlphaT_AtLogic_Data_25ns_cfg/, using the sample Signal_Run2015D_25ns – have been generated (see following slides). Rough copies formatted in Excel, finished tables will be LaTeXed.
- Length of time taken per sample to generate tables is $\mathcal{O}$(hours), and on a similar timescale to clean up the tables and make them look presentable.

CURRENT PROGRESS (CONTINUED)

- I'm just waiting for my guest account at Imperial before I can create the cut flow tables for the benchmark models listen in SUS-15-005.

- Future plans have been discussed which would allow cut flow tables to be created during tree production (Tai's idea). Implementation could begin once the tables for the 2015 analysis have been completed.

NUMBER OF EVENTS FOR SIGNAL DATA

Total events:	3496223	265787	406529	2010837	150004	294266
Skim	HTMHT_PromptReco_v4	JetHT_PromptReco_v4	MET_PromptReco_v4	HTMHT_05Oct2015_v1	JetHT_05Oct2015_v1	MET_05Oct2015_v1
defaultSkim	1620182	232417	243389	931818	130936	169599
bDPhiSkim	1356331	2793	141511	780418	1658	105672
objectSkimmer	1356331	2793	141511	780418	1658	105672
primaryDatasetSkimmer	1356331	2793	141511	780418	1658	105672
cutFlowSkimmer	1356331	2793	141511	780418	1658	105672
mllSkimmer	1356331	2793	141511	780418	1658	105672
minDRJetSkimmer	1356331	2793	141511	780418	1658	105672
JSONSkimmer	1221348	2503	125660	438851	933	49855
badMCEventSkimmer	1221348	2503	125660	438851	933	49855
relIsoSkimmer	1221348	2503	125660	438851	933	49855
eleEtaSkimmer	1221348	2503	125660	438851	933	49855
promptPhotonSkimmer	1221348	2503	125660	438851	933	49855
ttJetsSkimmer	1221348	2503	125660	438851	933	49855
photonPtSkimmer	1221348	2503	125660	438851	933	49855
triggerSkimmer	1207151	894	78165	435615	375	31855
filterSkimmer	1187870	864	72384	427555	362	28971
fwdJetSkimmer	61280	297	38578	21699	125	15824
tighterJetIdSkimmer	57502	284	23650	20293	121	8520
leadJetEtaSkimmer	57094	284	23465	20135	120	8451
mhtDivMetSkimmer	14472	116	18508	5166	40	6525
OddJetSkimmer	14400	114	18434	5139	40	6508
mtSkimmer	14400	114	18434	5139	40	6508
IsoTrackSkimmer	12660	106	17098	4511	35	6023

CUMULATIVE EFFICIENCIES FOR SIGNAL DATA (%)

Skim	HTMHT_PromptReco_v4	JetHT_PromptReco_v4	MET_PromptReco_v4	HTMHT_05Oct2015_v1	JetHT_05Oct2015_v1	MET_05Oct2015_v1
defaultSkim	46.34	87.44	59.87	46.34	87.29	57.63
bDPhiSkim	38.79	1.05	34.81	38.81	1.11	35.91
objectSkimmer	38.79	1.05	34.81	38.81	1.11	35.91
primaryDatasetSkimmer	38.79	1.05	34.81	38.81	1.11	35.91
cutFlowSkimmer	38.79	1.05	34.81	38.81	1.11	35.91
mllSkimmer	38.79	1.05	34.81	38.81	1.11	35.91
minDRJetSkimmer	38.79	1.05	34.81	38.81	1.11	35.91
JSONSkimmer	34.93	0.94	30.91	21.82	0.62	16.94
badMCEventSkimmer	34.93	0.94	30.91	21.82	0.62	16.94
relIsoSkimmer	34.93	0.94	30.91	21.82	0.62	16.94
eleEtaSkimmer	34.93	0.94	30.91	21.82	0.62	16.94
promptPhotonSkimmer	34.93	0.94	30.91	21.82	0.62	16.94
ttJetsSkimmer	34.93	0.94	30.91	21.82	0.62	16.94
photonPtSkimmer	34.93	0.94	30.91	21.82	0.62	16.94
triggerSkimmer	34.53	0.34	19.23	21.66	0.25	10.83
filterSkimmer	33.98	0.33	17.81	21.26	0.24	9.85
fwdJetSkimmer	1.75	0.11	9.49	1.08	0.08	5.38
tighterJetIdSkimmer	1.64	0.11	5.82	1.01	0.08	2.90
leadJetEtaSkimmer	1.63	0.11	5.77	1.00	0.08	2.87
mhtDivMetSkimmer	0.41	0.04	4.55	0.26	0.03	2.22
OddJetSkimmer	0.41	0.04	4.53	0.26	0.03	2.21
mtSkimmer	0.41	0.04	4.53	0.26	0.03	2.21
IsoTrackSkimmer	0.36	0.04	4.21	0.22	0.02	2.05

EXCLUSIVE EFFICIENCIES FOR SIGNAL DATA (%)

Skim	HTMHT_PromptReco_v4	JetHT_PromptReco_v4	MET_PromptReco_v4	HTMHT_05Oct2015_v1	JetHT_05Oct2015_v1	MET_05Oct2015_v1
defaultSkim	46.34	87.44	59.87	46.34	87.29	57.63
bDPhiSkim	83.71	1.20	58.14	83.75	1.27	62.31
objectSkimmer	100.00	100.00	100.00	100.00	100.00	100.00
primaryDatasetSkimmer	100.00	100.00	100.00	100.00	100.00	100.00
cutFlowSkimmer	100.00	100.00	100.00	100.00	100.00	100.00
mllSkimmer	100.00	100.00	100.00	100.00	100.00	100.00
minDRJetSkimmer	100.00	100.00	100.00	100.00	100.00	100.00
JSONSkimmer	90.05	89.62	88.80	56.23	56.27	47.18
badMCEventSkimmer	100.00	100.00	100.00	100.00	100.00	100.00
relIsoSkimmer	100.00	100.00	100.00	100.00	100.00	100.00
eleEtaSkimmer	100.00	100.00	100.00	100.00	100.00	100.00
promptPhotonSkimmer	100.00	100.00	100.00	100.00	100.00	100.00
ttJetsSkimmer	100.00	100.00	100.00	100.00	100.00	100.00
photonPtSkimmer	100.00	100.00	100.00	100.00	100.00	100.00
triggerSkimmer	98.84	35.72	62.20	99.26	40.19	63.90
filterSkimmer	98.40	96.64	92.60	98.15	96.53	90.95
fwdJetSkimmer	5.16	34.38	53.30	5.08	34.53	54.62
tighterJetIdSkimmer	93.83	95.62	61.30	93.52	96.80	53.84
leadJetEtaSkimmer	99.29	100.00	99.22	99.22	99.17	99.19
mhtDivMetSkimmer	25.35	40.85	78.87	25.66	33.33	77.21
OddJetSkimmer	99.50	98.28	99.60	99.48	100.00	99.74
mtSkimmer	100.00	100.00	100.00	100.00	100.00	100.00
IsoTrackSkimmer	87.92	92.98	92.75	87.78	87.50	92.55

NEXT STEPS

- Once my Imperial account is sorted, generate the raw cut flow tables for each of the benchmark models listed in the paper.
- Translate the names of the skimmers (bDPhiSkim, photonPtSkimmer, etc.) into the actual cuts.
- Format the tables correctly (in LaTeX): aesthetics, order of cuts, etc.
- Present the tables to the RA1 group for review.

PLANS BEYOND THE 2015 ANALYSIS

- Ideally be able to implement code that creates cut flow tables during tree production.
- Requires a new event selection dictionary to suit atlogic in cmgtools-lite-private.
- Will build an alternative version of the “All” class in EventSelectionAll and include counting variables to create cut flow efficiencies.