

Open HS3 PRs

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Combined data sets and category-selected distributions

[PR #119](#)

```
{
  "name": "channels",
  "type": "named_joint_dist",
  "categorical_variate": ["regions", "observables"],
  "categories": [
    {"category": ["SR", "physics"], "dist": "sr"},
    {"category": ["SR", "global"], "dist": "global_sr"}
  ]
}

// category_conditional_dist: same shape, category from parameters
// combined data set: {"category": [...], "dataset": ...}
```

- Everybody happy with `category_conditional_dist`?
- Multiple categorical variables allowed for all (named joint dist, category-conditional dist and categorical function) >> flatten into supercategory (which can omit category-combinations) permitted to match dataset

diagonal_dist for compact constraints

[PR #109](#)

```
{
  "name": "gauss_constraints",
  "type": "diagonal_dist",
  "of": "gaussian_dist",
  "category_index": ["np_index"],
  "x": "gaussian_constraint_x",
  "default_parameters": {"sigma": "gaussian_constraints_sigma"},
  "categories": [
    {"category": ["nom_np_1"], "parameters": {"mean": "np_1", "sigma":
"np_1_sigma"}},
    {"category": ["nom_np_2"], "parameters": {"mean": "np_2"}},
    {"category": ["nom_np_3"], "parameters": {"mean": "np_3", "sigma":
31.622}}
  ]
}
```

- Recommend this over product_dist and point-data constraints?

Refactor axes into an appendix

[PR #126](#)

```
// last axis varies fastest
"axes": [
  {"name": "region", "categories": ["SR", "CR"]},
  {"name": "mass", "min": 100, "max": 160, "nbins": 3}
],
"contents": [
  SR.bin0, SR.bin1, SR.bin2,
  CR.bin0, CR.bin1, CR.bin2
]
```

- Row-major order
- When may an attribute be declared forbidden? (issue #128)

HistFactory specification sync

[PR #124](#)

```
{
  "name": "mySignal",
  "data": {"contents": [0.5, 0.7], "errors": [0.1, 0.1]},
  "modifiers": [
    {"type": "normsys",
      "parameters": ["my_normalization_systematic_1"],
      "constraints": ["my_normalization_systematic_1_constraint"]},
    {"type": "statererror",
      "parameters": ["gamma_stat_1", "gamma_stat_2"],
      "constraints": ["gamma_stat_1_constraint",
        "gamma_stat_2_constraint"]}
  ]
}
// was: "constraint": "Poisson" · null = unconstrained
```

- Replace barlow_beeston_lite_poisson_constraint_dist with a Poisson diagonal_dist (#109)?

Convolution and decay resolution models

[PR #116](#)

```
{
  "name": "two_sided_decay",
  "type": "decay_convolution_dist",
  "x": "decay_time",
  "envelope": {"scale": "lifetime", "support": "both"},
  "terms": [
    {"coefficient": 1.0, "basis": {"type": "constant"}}
  ],
  "kernel": {"type": "delta"}
}

// bases: constant, sin, cos, sinh, cosh · kernels: gaussian, delta,
mixture
// fft_convolution_dist: {"x", "source": "...", "kernel": "..."}

```

- How to guarantee only analytically convolvable pieces enter: catalog or factorized_sum?
- does proposed catalog cover your resolution models?

A histfactory function, HistFactory as an appendix

[PR #129](#)

```
// new: the prediction only
{"name": "...", "type": "histfactory", ...}
  → HistFactoryFunction_i( $\theta$ ) =  $\lambda_i(\theta)$ 
// unchanged in syntax, now a stub pointing to the appendix
{"name": "...", "type": "histfactory_dist", ...}
  → HistFactoryPdf(n) =  $\prod_i \text{Poisson}(n_i, \lambda_i(\theta))$ 

// "all further components as defined in Section HistFactory"
```

- Deprecate histfactory_dist, or keep both forever?
 - Which route would pyhs3 take to emit?

Blocked PRs

- step, histogram, bin-volume function #121 → blocked by : ROOT issue #2330
- HAMMER template distribution #115 → on hold until Misha's FR in flatppl is converged/implemented
- (factorized normalization for) product_dist #101 → blocked by issue #125