Aggregate Class Cheat Sheet

m Aggregate(name, exp_el=0, exp_premium=0, exp_lr=0, exp_en=0, exp_attachment=0, exp_limit=np.inf, sev_name='', sev_a=np.nan, sev_b=0, sev_mean=0, sev_cv=0, sev_loc=0, sev_scale=0, sev_xs=None, sev_ps=None, sev_wt=1, sev_conditional=True, occ_reins=None, occ_kind='', freq_name='', freq_a=0, freq_b=0, freq_zm=False, freq_p0=np.nan, agg_reins=None, agg_kind='', note='')[0]

The Aggregate call signature follows the corresponding DecL clauses, using prefixes for exposure (including limit sub-clause), severity, occurrence reinsurance, frequency, aggregate reinsurance, and note. sev_xs, sev_ps equal dsev outcomes and probabilities, and (occ|agg)_reins clauses are lists of (share, limit, attachment) triples. The following tables show all m methods, and fields or properties (used interchangeably). Comments elucidate the meaning of more obscure entries.

1. Specification & creation

name, limit, attachment, freq_name, freq_a, freq_b, freq_p0, freq_zm, note, sev_pick_attachments, sev_pick_losses, program (DecL program), pprogram (pretty printed), spec (constructor kwarg dictionary; Aggregate(**spec) re-creates the object), spec_ex (adds meta elements)

2. Update

log2, bs, sev_calc (discrete=round, forward, backwards), discretization_calc (distribution, survival, both), normalize, padding, tilt_vector, approximation (exact, slognorm, sgamma), fzapprox (frozen approximation rv), m picks, m discretize, m easy_update, m recommend_bucket, m rescale (homogeneous severity or inhomogeneous frequency rescaling), m update, m update_work

3. Moments

est prefix=estimated from FFT approximation
agg_m, agg_cv, agg_sd, agg_var, agg_skew, est_m, est_cv, est_sd, est_var, est_skew, sev_m, sev_cv, sev_sd, sev_var, sev_skew, est_sev_m, est_sev_cv, est_sev_sd, est_sev_var, est_sev_skew, m freq_moms, m freq_pmf, m freq_pgf, panjer_ab (Panjer parameters), m prn_eq_0 (Pr($N = 0$) unmodified), n (frequency), en (vector), unmodified_mean (when ZT or ZM)

4. Statistical functions

sevs (list of Severity s), m cdf, m sf (survival), m pdf, m pmf, m q (lower quantile=VaR), m tvar, m sev (exact severity cdf, sf, pdf), m q_sev, m tvar_sev, m var_dict[1], m sample

5. Validation

describe (validation statistics), valid (true="not unreasonable" or false), validation_eps (validation epsilon threshold 1e-04), m qt ("quick test" validation details), m aggregate_error_analysis (agg errors over range of bs), m severity_error_analysis (truncation and discretization errors by severity component)

6. Output dataframes

density_df[1] (main output), report_df (component, mixture & empirical stats), agg_density, agg_density_ceded, agg_density_gross, agg_density_net, sev_density, sev_density_ceded, sev_density_gross, sev_density_net, ftagg_density, xs, statistics_df (row, by component), statistics_total_df (row, indep. vs. mixed), statistics (cols, combined, better index), audit_df (deprecated), report_ser (internal, series), *see also Reinsurance.*

7. Reinsurance

agg_kind (net of or ceded to), agg_reins (list), agg_reins_df (gcn loss and dists), occ_kind, occ_reins, occ_reins_df, m agg_ceder, m agg_netter, m apply_agg_reins, m occ_ceder, m occ_netter, m apply_occ_reins, m reinsurance_description (text rendering of re), reinsurance_kinds (None, occ, agg, occ & agg), reinsurance_audit_df (stats by gcn, splits severity for occ), reinsurance_occ_layer_df (aggregate gcn stats for occ layers), reinsurance_df (all combinations of gcn occ and agg densities), reinsurance_report_df (m, cv, sd, skew for reinsurance_df)

8. Visualization

m plot, m reinsurance_occ_plot figure (return last figure), m limits (suggest axis limits for plotting),

9. Risk and pricing

m apply_distortion, m price(p, dist) m cramer_lundberg aka pollaczeck_khinchine (probability of eventual ruin vs. initial capital and margin)

10. Approximations

Method of moments (shifted gamma or lognormal), or minimum entropy approximations.
m approximate, m entropy_fit

11. Meta

aggregate_keys (internal), m more(regex) (print all methods and fields matching regex), info (text meta info), m html_info_blob (internal), m json (persist to json), m snap[1] (snap argument to index)

Notes:

[0]: Arguments sev_pick_attachments=None, sev_pick_losses=None, omitted; see help.

[1]: matches Portfolio

Any vectorizable input accepts numeric or iterable datatypes.

Abbreviations: gcn=gross (subject), ceded, and net; stats: m=mean, cv=coefficient of variation, sd=standard deviation, var=variance, skew(ness); VaR=value-at-risk

aggregate v.0.18.0
Confidence and precision meets ease of use in actuarial analysis

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