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% Example 7.1 %

% Top-Down Top-Level Risk Integration %

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% 1. Normal copula generation of y and z

randn('state', 123456);

rho = 0.4;

nCases = 10e3;

draws = copularnd('Gaussian', rho, nCases);

% 2. Credit loss

A = 100; % Exposure

a = 0.4; b = 20; % Parameters Beta

CLoss = A \* betainv(draws(:,1), a, b);

% 3. Operational loss

alpha\_0 = A/4000; alpha\_1 = 0.1; % Paremeters lognormal

OLoss = logninv(draws(:,2), alpha\_0, alpha\_1);

% 4. Market loss

beta0 = 0.01; beta1 = 0.00003;

gamma0 = 0.01; gamma1 = 0.00002;

mu = beta0 + beta1 \* CLoss;

sigma = gamma0 + gamma1 \* CLoss;

Ml=A/100;

MLoss = Ml\*exp(mu + sigma.^2 / 2);

% 5. Total loss

TLoss = CLoss + OLoss + MLoss;

VaR=quantile(TLoss,0.99);

% Graph

figure; spessore=15; hold('on'); histogram(TLoss,'FaceColor','blue');

set(gca,'XLim',[1 20]); title('Top-Level Integration Loss','Fontsize',spessore);

xlabel('Loss','Fontsize',spessore), ylabel('Frequency','Fontsize',spessore);FontSizeAxes=spessore;

set(gca,'FontSize',FontSizeAxes)

set(gcf, 'PaperPositionMode', 'manual');

set(gcf, 'PaperUnits', 'centimeters');

set(gcf, 'PaperPosition', [0.5 0.5 28 20]);

set(gcf, 'PaperOrientation', 'landscape');