Replicated stratified sampling – a practical approach to financial modeling

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Replicated Stratified Sampling (RSS) is a new technique in statistics and actuarial science. It uses a generalized risk management algorithm which can exponentially speed up the calculation process for changes in any risk measure with a pre-determined accuracy level. It has applications in all areas of actuarial science and financial modeling in general. While the RSS technique is new for actuarial science, it opens up a new area of research in statistics as well since it works with multiple samples and pools the sample distributions to estimate the underlying population distribution. The RSS technique uses basic statistics techniques of stratified sampling to estimate the population distribution, but incorporates a unique feature of utilizing repeated new samples and combining results in order to speed up the convergence to the population distribution. Unlike other existing techniques used to speed up processing time. The RSS technique is flexible and robust since it does not attempt to simplify the underlying population distribution of the risk measure. It is also easy to implement since the RSS algorithm attaches to and utilizes a company's existing actuarial software. The technique has been empirically tested and validate for a VACARVM calculation of a major insurance company and the results are extremely promising.