Abstract Due to the new Basel Capital Accord, the financial institutions need to develop a risk management tool for losses arising from all types of operational risk before 2006. In order to quantify the aggregate losses from all lines of operational risk, we employ an actuarial risk models. The Value at Risk (VaR) and tail conditional expectation (TCE, also known as TailVaR) are used to obtain the capital charge for operational risk. As a homogeneous Poisson process is not adequate to deal with irregular loss arrival time as well as a tendency to increase over time in practice, we employ the Cox process with shot noise intensity for loss arrival process from quantifiable operational risk (Embrechts and Samorodnitsky, 2002). We use the asymptotic distribution of the loss intensity to obtain the explicit expression of the Laplace transform of the distribution of aggregate losses. The loss size and primary event jump size distributions are assumed to follow exponential distributions. The calculations of VaR and tail conditional expectation (TCE) are illustrated using Transform Analysis technique from the financial option pricing literature. In order to include losses from non-quantifiable operational risk, we levy a security loading, which is well-known for premium calculation in actuarial science, on the original VaR and TCE calculated only for quantifiable operational risk.

Keywords: The compound Cox process; Shot noise process; Piecewise deterministic Markov process; VaR; Tail conditional expectation (TCE); Operational risk; Transform analysis.