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Retraction

Retraction: Hang, Y.; Liu, Y.; Xu, X.; Chen, Y.; Mo, S. Sensitivity Analysis Based on Markovian Integration by Parts Formula. *Math. Comput. Appl.* 2017, 22, 40

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We, the authors, have requested that the title paper [1] is retracted. The results are not reliable due to the technique we applied. Developed in [2], the measure change technique characterizes pure jump martingales and establishes the integration by parts formula for functions of the numbers of chain transitions. However, this characterization cannot be applied to the shift of a Markov jump process $(\beta_t)_{t\in[0,T]}$ as claimed in Lemma 2 of [2]. Doing so would require the absolute continuity of the discrete random variable β_t.

Moreover, the gradient definition in Equation (26) is not correct. We stated that for any $x = (x_1, x_2)' \in \mathbb{R}^2$ and function G on $\mathbb{R}^2$, gradient D_x of G is defined by

$$D_x G(x) = \left(\frac{\partial}{\partial x_1} G(x), \frac{\partial}{\partial x_2} G(x)\right).$$

However, consider a two-state Markov chain $(\beta_t)_{t\in[0,T]}$ on a finite time horizon $\{[0,T], T > 0\}$ where $J_{x,y}(T)$ denotes the number of chain transitions from state x to state y. Obviously $(J_{1,2} - J_{2,1})^2 = 1$, but the taking gradient unexpectedly yields $(2J_{1,2}, 2J_{2,1})' = (0,0)' \in \mathbb{R}^2$. Despite several attempts, we were not able to correct this.

In order that readers are not misled by the incorrect results, [1] will be marked as retracted.

References

1. Hang, Y.; Liu, Y.; Xu, X.; Chen, Y.; Mo, S. Sensitivity Analysis Based on Markovian Integration by Parts Formula. *Math. Comput. Appl.* **2017**, 22, 40. [CrossRef]
2. Siu, T.K. Integration by parts and martingale representation for a Markov chain. *Abstr. Appl. Anal.* **2014**, *2014*. [CrossRef]