Health Insurance Mathematics –Assignments (2)

1. (10p) Derive the matrix form of Chapman-Kolmogorov equations.

2. (10p) Check the form of P(z), when matrix M has N eigenvalues $\lambda_1<\lambda_2<\ldots<\lambda_N$.

3. (10p) Find $P_{ij}(z)$ for a 2-state model, under the assumption that $\mu_{12}= \mu_{21}=0.01$. Use the matrix form of Chapman-Kolmogorov equations.

4. (10p) Find $P_{ij}(z)$ for 3-state model, under the assumption that $\mu_{12}=0.02$, $\mu_{23}=0.01$, $\mu_{13}=0.01$ (other transition intensities are equal to 0). Use the matrix form of Chapman-Kolmogorov equations.

5. (10p) Suppose that the Markov chain {S(t)} is time-homogeneous. Find the actuarial values (calculated at time t=0) of cash flows that appear in insurance model introduced in Examples 1-3 (it is left to propose cash flows on your own).

6. (10p) Suppose that the Markov chain {S(t)} is time-homogeneous. Find the actuarial values (calculated at time t=0) of cash flows that appear in insurance model introduced in Example 6 (it is left to propose cash flows on your own).

7. (10p) Suppose that the Markov chain {S(t)} is time-homogeneous. Find the actuarial values (calculated at time t=0) of cash flows that appear in insurance model introduced in Example 7 (it is left to propose cash flows on your own).

8. (10p) Suppose that the Markov chain {S(t)} is time-homogeneous. Find the actuarial values (calculated at time t=0) of cash flows that appear in insurance model introduced in Example 8 (it is left to propose cash flows on your own).