MATH 3631 - Actuarial Mathematics II
Spring 2010 - Valdez
Homework No. 4
due Monday, 4:50 PM, 29 March 2010

Please return this page with your signature. Please write your name and student number at the spaces provided:

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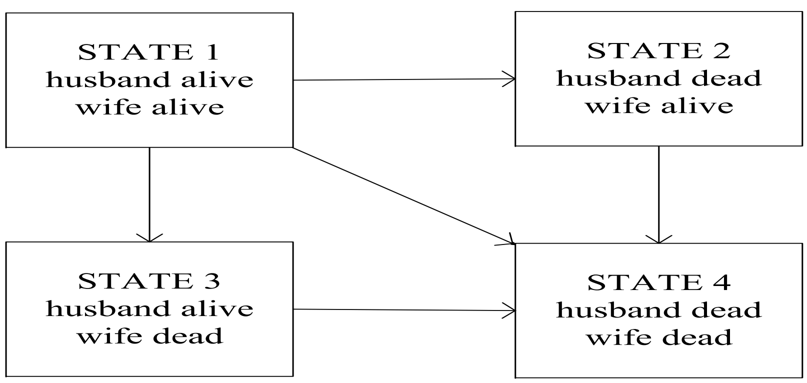
A four-state homogeneous Markov model represents the joint mortality of a married couple: a husband and a wife. The states are: 1 = husband alive, wife alive; 2 = husband dead, wife alive; 3 = husband alive, wife dead, and 4 = both husband and wife dead.



The one-year transition probabilities are:

$$\begin{array}{c c} & \begin{array}{cccc} 1 & 2 & 3 & 4 \end{array} \\ \begin{array}{c} 1 \\ 2 \\ 3 \\ 4 \end{array} & \begin{pmatrix} 0.95 & 0.02 & 0.02 & 0.01 \\ 0.00 & 0.95 & 0.00 & 0.05 \\ 0.00 & 0.00 & 0.94 & 0.06 \\ 0.00 & 0.00 & 0.00 & 1.00 \end{pmatrix} \end{array}.$$

A life insurer sells a two-year term insurance contract to a married couple who are both age 60. The death benefit of 100,000 is payable at the end of the year in which the second life dies, if both die within 2 years.

Premiums are payable annually in advance. Interest rate $i = 6\%$.

Calculate the annual benefit premium.