Manual for SOA Exam MLC.

Chapter 6. Benefit premiums.

Section 6.7. Premiums paid m times a year.

Extract from:
"Arcones' Manual for SOA Exam MLC. Spring 2009 Edition",
available at http://www.actexmadriver.com/

Premiums paid m times a year.

Often insurance is funded several times a year. The computation of the premium when premiums are paid m times a year is similar to the annual case. The total amount of payments made a year is denoted by the **annual funding rate** and it denoted by $P^{(m)}$. The funding payment paid m times a year is $\frac{P^{(m)}}{m}$.

Insurances paid the end of the year of death.

In this subsection, we consider insurance paid at the end of year of death and funded with level payments made at the beginning of the period of $\frac{1}{m}$ years while the individual is alive. We assume the equivalence principle is used.
For a whole life insurance to (x), the annual funding rate is

$$P_x^{(m)} = \frac{A_x}{\ddot{a}_x^{(m)}}.$$

For an n–year term insurance to (x), the annual funding rate is

$$P_{x:\overline{n}|}^{1\ (m)} = \frac{A_{x:\overline{n}|}^{1}}{\ddot{a}_{x:\overline{n}|}^{(m)}}.$$

For an n–year pure endowment to (x), the annual funding rate is

$$P_{x:\overline{n}|}^{\ \ 1\ (m)} = \frac{A_{x:\overline{n}|}^{\ \ 1}}{\ddot{a}_{x:\overline{n}|}^{(m)}}.$$

For an n–year endowment to (x), the annual funding rate is

$$P_{x:\overline{n}|}^{(m)} = \frac{A_{x:\overline{n}|}}{\ddot{a}_{x:\overline{n}|}^{(m)}}.$$

For an n–year deferred insurance to (x), the annual funding rate is

$$P^{(m)}({}_n|A_x) = \frac{{}_n|A_x}{\ddot{a}_x^{(m)}}.$$

For an n–year deferred whole life annuity immediate to (x), the annual funding rate is

$$P^{(m)}({}_n|a_x) = \frac{{}_n|a_x}{\ddot{a}_x^{(m)}}.$$

For a whole life insurance to (x) funded for h years, the annual funding rate is

$${}_hP_x^{(m)} = \frac{A_x}{\ddot{a}_{x:\overline{h}|}^{(m)}}.$$

For an n–year endowment to (x) funded for h years, the annual funding rate is

$${}_hP_{x:\overline{n}|}^{(m)} = \frac{A_{x:\overline{n}|}}{\ddot{a}_{x:\overline{h}|}^{(m)}}.$$

For an n–year deferred insurance to (x) funding during the deferral period, the annual funding rate is

$$ {}_nP^{(m)}({}_n|A_x) = \frac{{}_n|A_x}{\ddot{a}^{(m)}_{x:\overline{n}|}}. $$

Insurances paid the time of death.

In this subsection, we consider insurance paid at time of death and funded with level payments made at the beginning of the period of $\frac{1}{m}$ years while the individual is alive. We assume the equivalence principle is used.

For a whole life insurance to (x) the annual funding rate is

$$P^{(m)}(\overline{A}_x) = \frac{\overline{A}_x}{\ddot{a}_x^{(m)}}.$$

For a n–year term insurance to (x), the annual funding rate is

$$P^{(m)}(\overline{A}^1_{x:\overline{n}|}) = \frac{\overline{A}^1_{x:\overline{n}|}}{\ddot{a}_{x:\overline{n}|}^{(m)}}.$$

For a n–year endowment to (x), the annual funding rate is

$$P^{(m)}(\overline{A}_{x:\overline{n}|}) = \frac{\overline{A}_{x:\overline{n}|}}{\ddot{a}^{(m)}_{x:\overline{n}|}}.$$

For a n–year deferred insurance to (x), the annual funding rate is

$$P^{(m)}({}_{n|}\overline{A}_{x}) = \frac{{}_{n|}\overline{A}_{x}}{\ddot{a}^{(m)}_{x}}.$$

For a whole life insurance to (x) funded for h years the annual funding rate is

$${}_{h}P^{(m)}(\overline{A}_{x}) = \frac{\overline{A}_{x}}{\ddot{a}^{(m)}_{x:\overline{h}|}}.$$

For a n–year endowment to (x) funded for h years, the annual funding rate is

$${}_{h}P^{(m)}(\overline{A}_{x:\overline{n}|}) = \frac{\overline{A}_{x:\overline{n}|}}{\ddot{a}^{(m)}_{x:\overline{h}|}}.$$

