Exercise 9.7

Since this is a reversionary annuity payable to \((y)\) following the death of \((x)\), then in the case where \((x)\) dies before \((y)\) so that \(T_x < T_y\), the present value of the annuity payments will be

\[ \bar{a}_{T_y} - \bar{a}_{T_x} \]

which is equivalent to

\[ \bar{a}_{T_y} - \bar{a}_{T_{xy}} \]

since in this case \(T_{xy} = \min(T_x, T_y) = T_x\). On the other hand, if \((x)\) outlives \((y)\), then the present value of the annuity payments will be zero:

\[ \bar{a}_{T_y} - \bar{a}_{T_{xy}} = \bar{a}_{T_y} - \bar{a}_{T_y} = 0 \]

Here in this case, we clearly have \(T_{xy} = \min(T_x, T_y) = T_y\).