STA 4183 – The Theory of Interest

Formulas for Annuities

Annuities	Present value	Accumulated value
Immediate	$a_{\overline{n}\vert} = \dfrac{1-\left(\frac{1}{1+i}\right)^n}{i}$	$s_{\overline{n}\vert} = \dfrac{(1+i)^n-1}{i}$
Due	$\ddot{a}_{\overline{n}\vert} = \dfrac{1-\left(\frac{1}{1+i}\right)^n}{d}$	$\ddot{s}_{\overline{n}\vert} = \dfrac{(1+i)^n-1}{d}$

Perpetuities	Present value
Immediate	$a_{\overline{\infty}\vert} = \dfrac{1}{i}$
Due	$\ddot{a}_{\overline{\infty}\vert} = \dfrac{1}{d}$

$\ddot{a}_{\overline{n}\vert} = (1+i)a_{\overline{n}\vert}$	$\ddot{a}_{\overline{n}\vert} = a_{\overline{n-1}\vert} + 1$	$n = \dfrac{-\log(1-ia_{\overline{n}\vert})}{\log(1+i)}$	$i \approx \dfrac{1-\left(\frac{a_{\overline{n}\vert}}{n}\right)^2}{a_{\overline{n}\vert}}$
$\ddot{s}_{\overline{n}\vert} = (1+i)s_{\overline{n}\vert}$	$\ddot{s}_{\overline{n}\vert} = s_{\overline{n+1}\vert} - 1$	$n = \dfrac{\log(1+is_{\overline{n}\vert})}{\log(1+i)}$	$i \approx \dfrac{\left(\frac{s_{\overline{n}\vert}}{n}\right)^2-1}{s_{\overline{n}\vert}}$