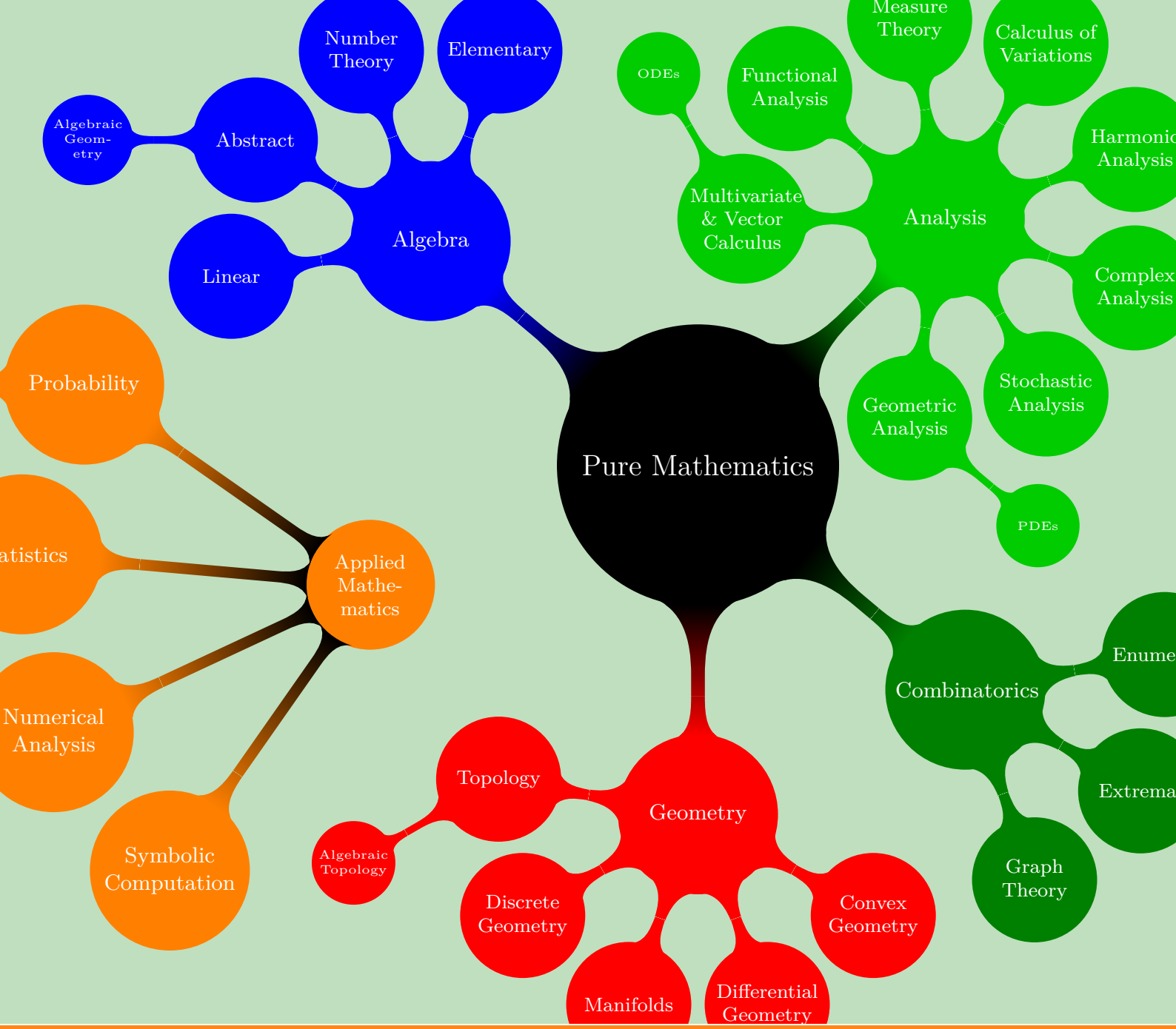

利息理论

made by LaTeX

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第一章 利息度量

1.1 累积函数

定义 1.1. 累积函数

时间零点的 1 元在时间 t 的累值，记为 $a(t)$

♣

性质 (1) $a(0)=1$

(2) $a(t)$ 通常是时间的增函数

(3) 当利息连续产生时，$a(t)$ 是时间的连续函数

1.2 贴现

定义 1.2. 贴现

$v=\frac{1}{1+i}$ $d=iv$

♣

定义 1.3. 利息力

设可积函数连续可导, 则称

$$\delta_t=\frac{a'(t)}{a(t)}=[\ln a(t)]'$$

为时刻 t 的利息力

♣

性质 累积函数:

$$a(t)=\exp\left(\int_0^t \delta_s ds\right)$$

贴现函数:

$$a^{-1}(t)=\exp\left(-\int_0^t \delta_s ds\right)$$

第二章 等额年金

2.1 符号一览

$a_{\overline{n}|}, s_{\overline{n}|}$

$\ddot{a}_{\overline{n}|}$

$\ddot{s}_{\overline{n}|}$

2.2 等额年金

定义 2.1. 年金的终值与现值

$a_{\overline{n}|}, s_{\overline{n}|}$

$s_{\overline{n}|} = a_{\overline{n}|}(1+i)^n = \frac{(1+i)^n-1}{i}$ ♣

$a_{\overline{n}|} = v + v^2 + v^3 + \cdots + v^n = \frac{1-v^n}{i}$

$\ddot{a}_{\overline{n}|} = \frac{1-v^n}{d}$

$s_{\overline{n}|} = a_{\overline{n}|}(1+i)^n = \frac{(1+i)^n-1}{i}$

$\ddot{s}_{\overline{n}|} = \ddot{a}_{\overline{n}|}(1+i)^n = \frac{(1+i)^n-1}{d}$

第三章 变额年金

3.1 符号一览

$(Ia)_{\overline{n}|}$: 第一年支付 1 元
$(Ia)_{\overline{n}|}^{(m)}$: 第一年支付 1 元，以后每年支付增加 1 元，每年支付 m 次
$(Ca)_{\overline{n}|}$: 复递增年金

3.2 变额年金

定义 3.1. 递增变额年金

$$(Ia)_{\overline{n}|} = v + 2v^2 + 3v^3 + \cdots + (n-1)v^{n-1} + nv^n$$

♣

注 $(Ia)_{\overline{n}|} = \frac{\ddot{a}_{\overline{n}|} - nv^n}{i}$
$(Is)_{\overline{n}|} = (1+i)^n (Ia)_{\overline{n}|}$

3.3 复递增年金

$(Ca)_{\overline{n}|}$: 复递增年金

定义 3.2. 期末付复递增年金

$$(Ca)_{\overline{n}|} = \frac{(a)_{\overline{n}|}}{1+r} (r \neq i)(j = \frac{i-r}{1+r})$$

♣

注 $(Ca)_{\overline{n}|} = v + (1+r)v^2 + (1+r)^2 v^3 + \cdots + (1+r)^{n-1} v^n$

第 四 章 收益率

4.1 收益率

4.2 基金的利息度量

定义 4.1. Dollar-Weighted Return For a One-Year Period

Suppose the following information is known: (i) the balance in a fund at the start of the year is A

(ii) for $0 < t_1 < t_2 < \cdots < t_n < 1$, the net deposit at time t_k is amount C_k (positive for a net deposit, negative for a net withdrawal), and

(iii) the balance in the fund at the end of the year is B Then the net amount of interest earned by the fund during the year is $I = B - \left[A + \sum_{k=1}^{n} C_k\right]$, and the dollar-weighted rate of return earned by the fund for the year is

$$\frac{I}{A + \sum_{k=1}^{n} C_k \left(1 - t_k\right)}$$

♣

注 $(Ia)_{\overline{n}|} = \frac{\ddot{a}_{\overline{n}|} - nv^n}{i}$

定义 4.2. Time-Weighted Return For a One-Year Period

Suppose the following information is known:

(i) the balance in a fund at the start of the year is A

(ii) for $0 < t_1 < t_2 < \cdots < t_n < 1$, the net deposit at time t_k is amount C_k(positive for a net deposit, negative for a net withdrawal)

(iii) the value of the fund just before the net deposit at time t_k is F_k, and

(iv) the balance in the fund at the end of the year is B The time-weighted return rate earned by the fund for the year is

$$\left[\frac{F_1}{A} \times \frac{F_2}{F_1 + C_1} \times \frac{F_3}{F_2 + C_2} \times \cdots \times \frac{F_k}{F_{k-1} + C_{k-1}} \times \frac{B}{F_k + C_k}\right] - 1$$

♣

4.3 再投资

4.4 基金