

CÁLCULO FINANCEIRO

Capítulo III – Serviço de dívida

**Diferentes abordagens no cálculo
de capitais em dívida**

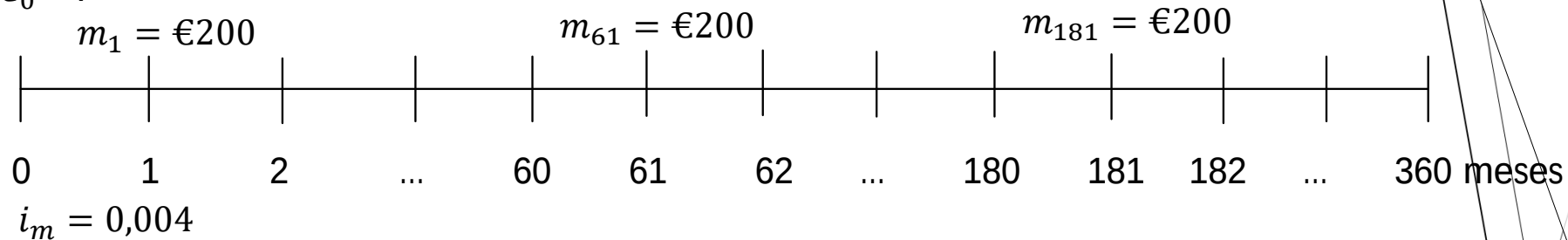
Utilização de folha de cálculo

EXEMPLO 5



EXEMPLO 5:

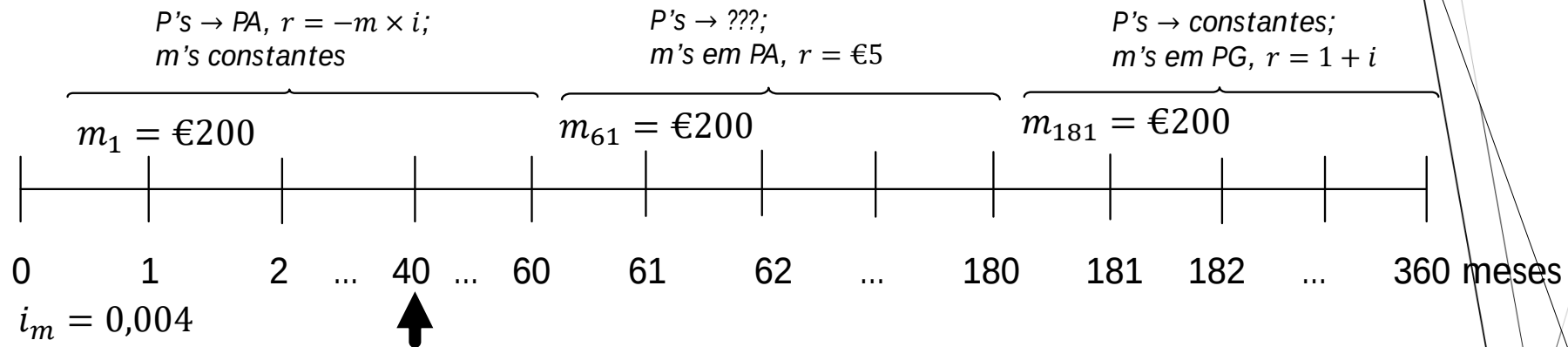
$C_0 = ?$



Empréstimo com o seguinte serviço de dívida mensal imediato normal:

- variável com parcelas de reembolso constantes (nos primeiros 5 anos);
- variável com parcelas de reembolso que crescem mensalmente €5 (nos 10 anos seguintes);
- constante (nos últimos 15 anos).
- o valor da 1.^a parcela de reembolso (€200) é igual ao valor da 61.^a parcela de reembolso e igual ao valor da 181.^a parcela de reembolso.
- Taxa de juro mensal efetiva 0,4%.

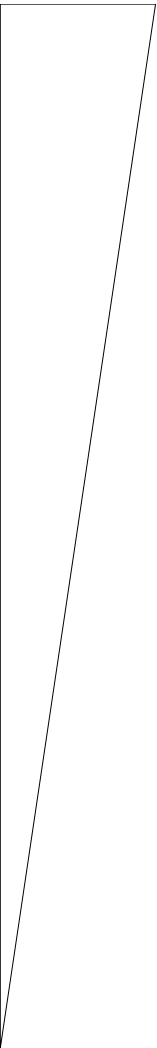
a) Capital em dívida, logo após o pagamento da 40.^a mensalidade?

$C_0 = ?$


a) Capital em dívida, logo após o pagamento da 40.^a mensalidade?

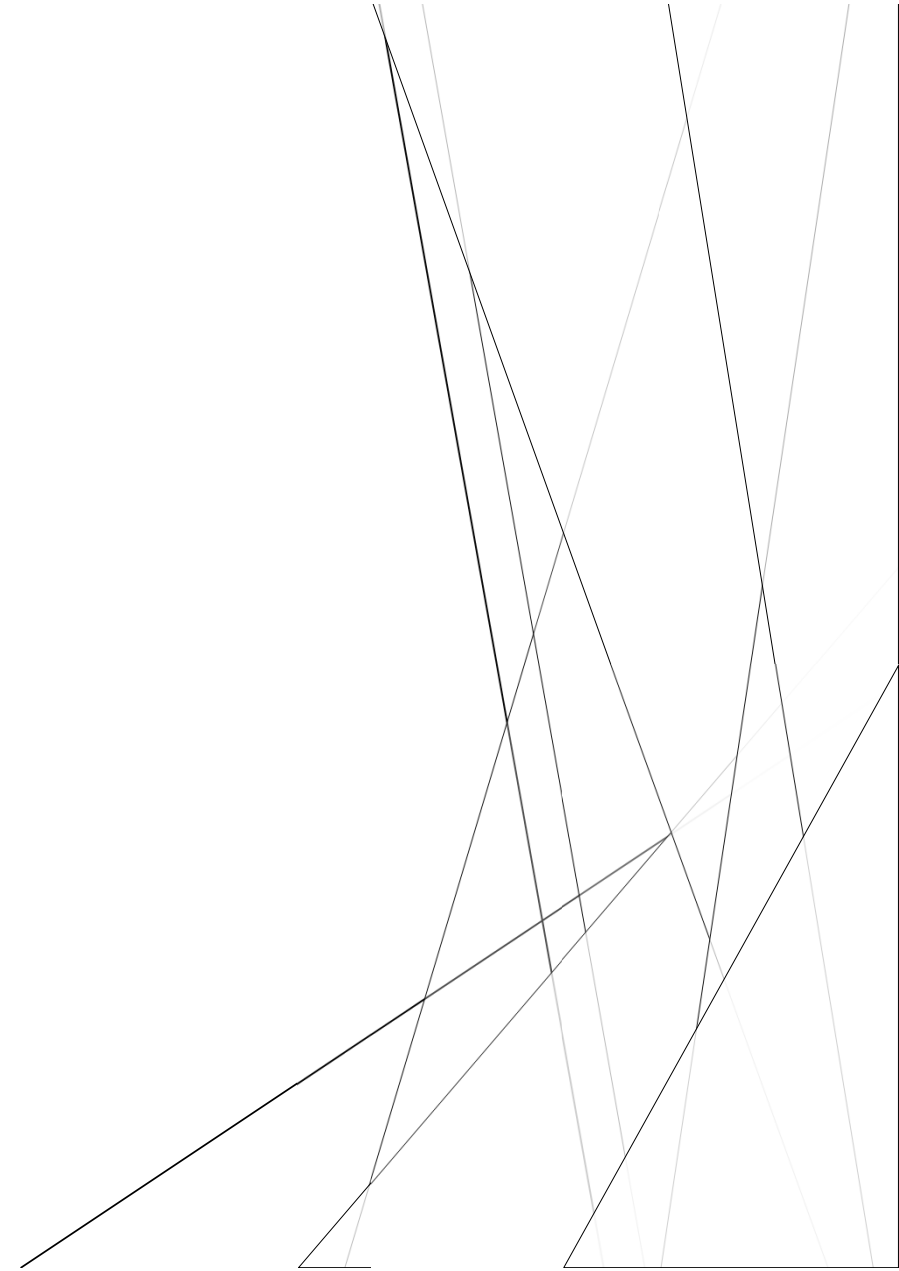
4 maneiras de efetuar o cálculo

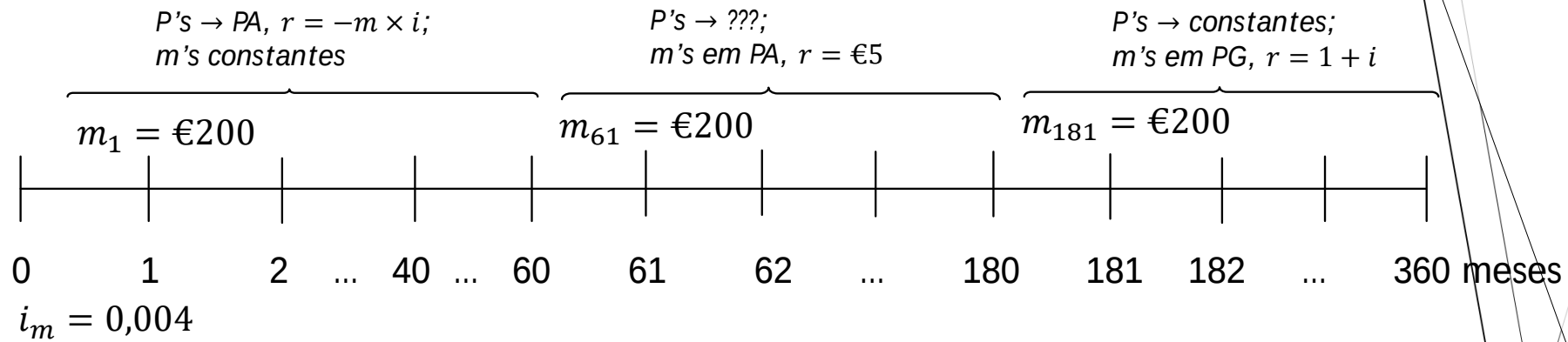
	Já entregues	Por entregar	
Pagamentos (P's)	1.1	1.2	Capítulo 2
Parcelas de reembolso de capital (m's)	2.1	2.2	Capítulo 3



1. Pelos pagamentos

1.2- Por entregar

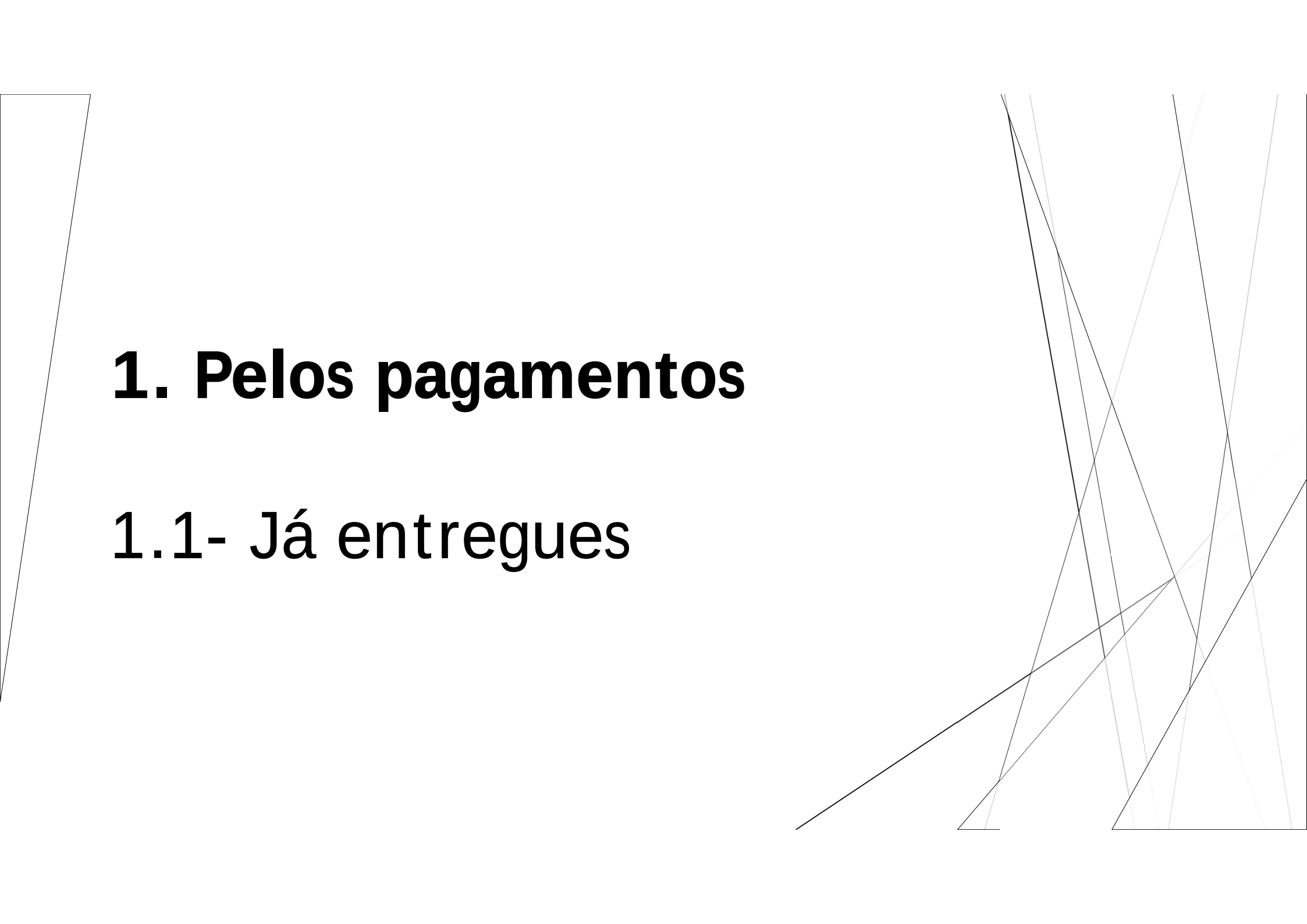


$C_0 = ?$


a) Capital em dívida, logo após o pagamento da 40.^a mensalidade?

4 maneiras de efetuar o cálculo

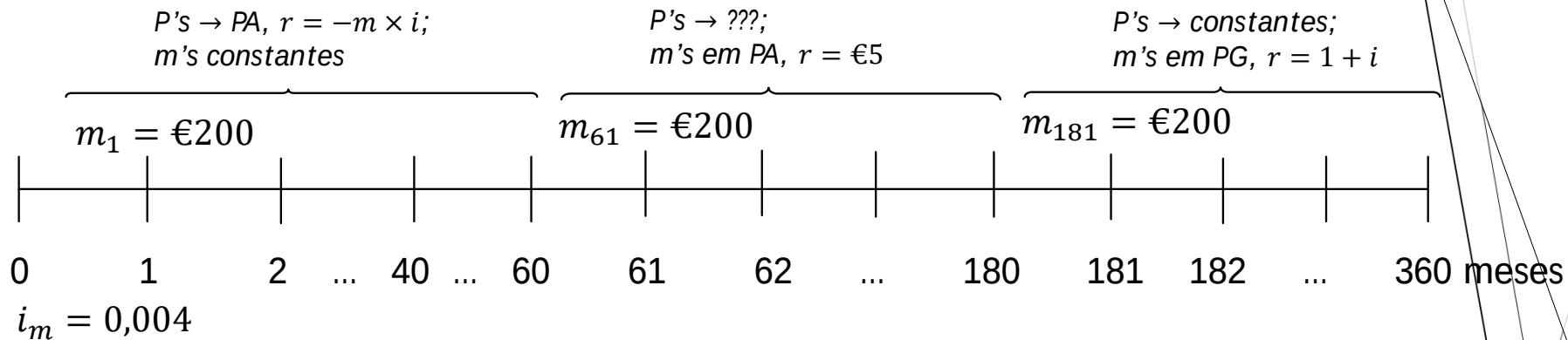
	Já entregues	Por entregar	
Pagamentos (P's)	1.1		Capítulo 2
Parcelas de reembolso de capital (m's)	2.1	2.2	Capítulo 3

The image features abstract geometric line art in the corners. The top-left corner contains a light gray trapezoidal shape. The bottom-right corner is filled with a complex network of thin, intersecting lines in various shades of gray, creating a dynamic, architectural feel.

1. Pelos pagamentos

1.1- Já entregues

$C_0 = ?$



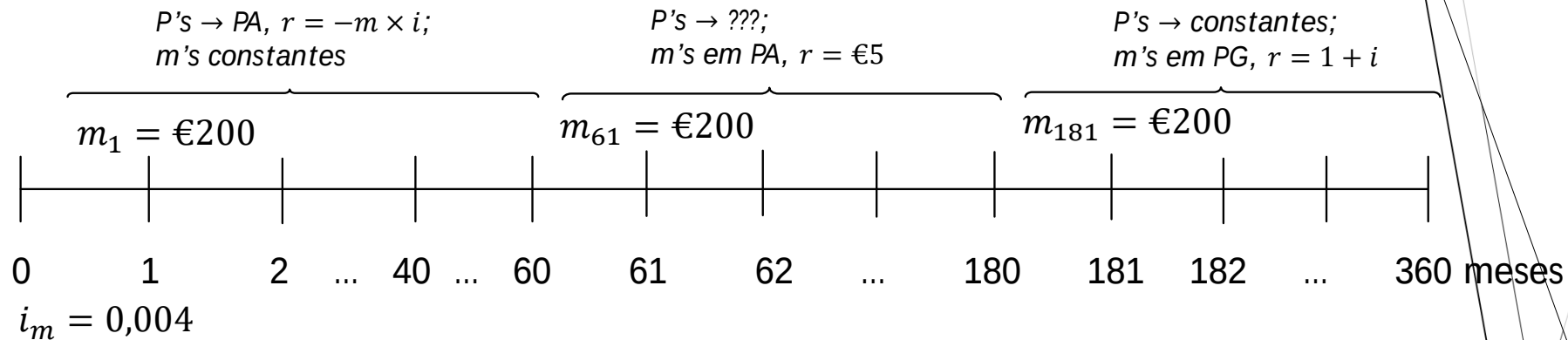
a) Capital em dívida, logo após o pagamento da 40.^a mensalidade?

$$C_t = (VR_0 - VP_0) \times (1 + i_k)^t \quad r = -m \times i = -€200 \times 0,004 = -€0,8$$

$$C_{40} = \left[C_0 - \left[a_{\overline{40}|0,004} \times \left(P_1 + \frac{(-€0,8)}{0,004} + (-€0,8) \times 40 \right) - \frac{(-€0,8) \times 40}{0,004} \right] \right] \times (1 + 0,004)^{40}$$

$$P_1 = j_1 + m_1 = C_0 \times 0,004 + €200$$

$C_0 = ?$



a) Capital em dívida, logo após o pagamento da 40.^a mensalidade?

$$C_t = (VR_0 - VP_0) \times (1 + i_k)^t \quad r = -m \times i = -€200 \times 0,004 = -€0,8$$

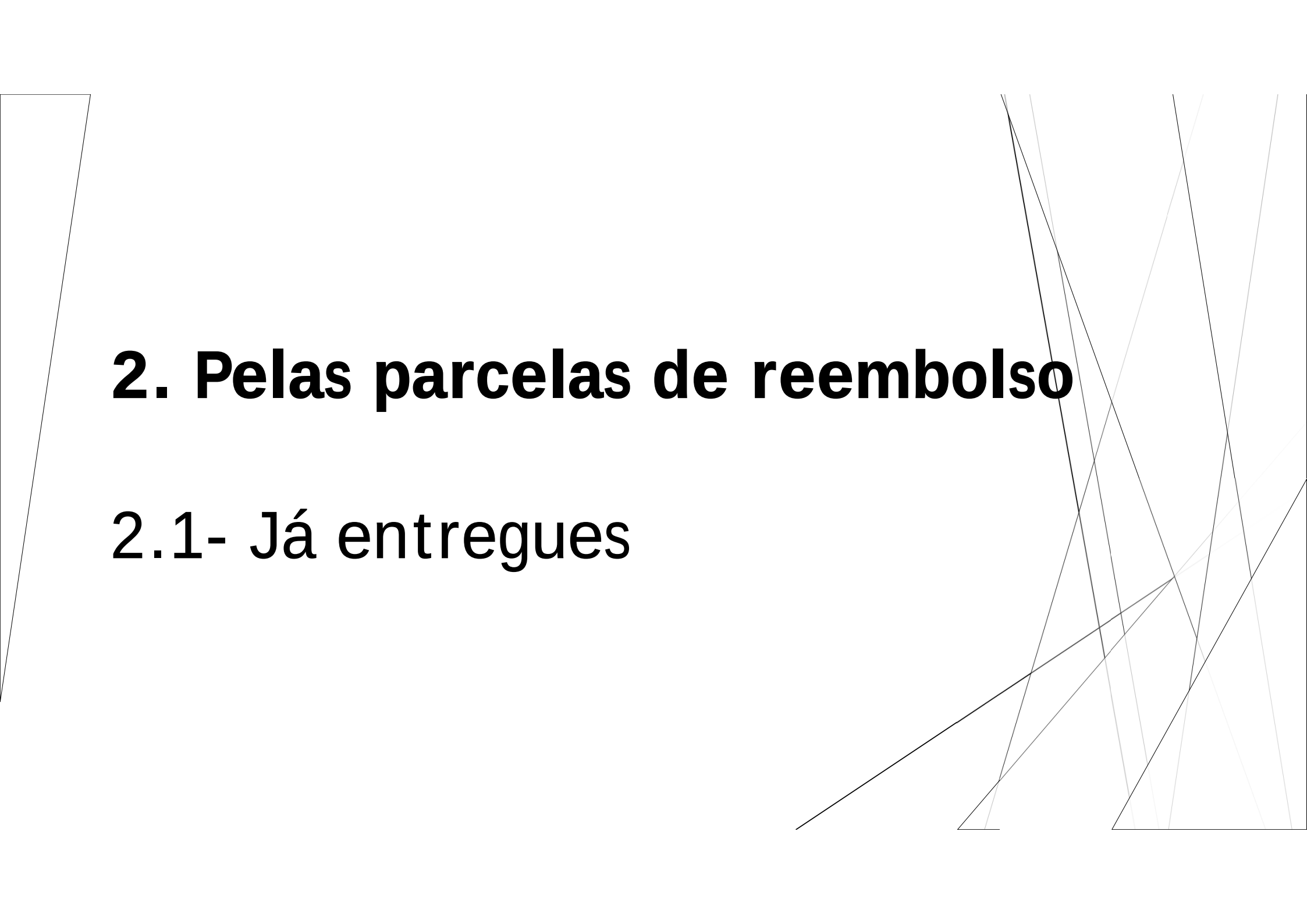
$$C_{40} = \left[C_0 - \left[a_{\overline{40}|0,004} \times \left(P_1 + \frac{(-€0,8)}{0,004} + (-€0,8) \times 40 \right) - \frac{(-€0,8) \times 40}{0,004} \right] \right] \times (1 + 0,004)^{40}$$

?

$$P_1 = j_1 + m_1 = C_0 \times 0,004 + €200$$

4 maneiras de efetuar o cálculo

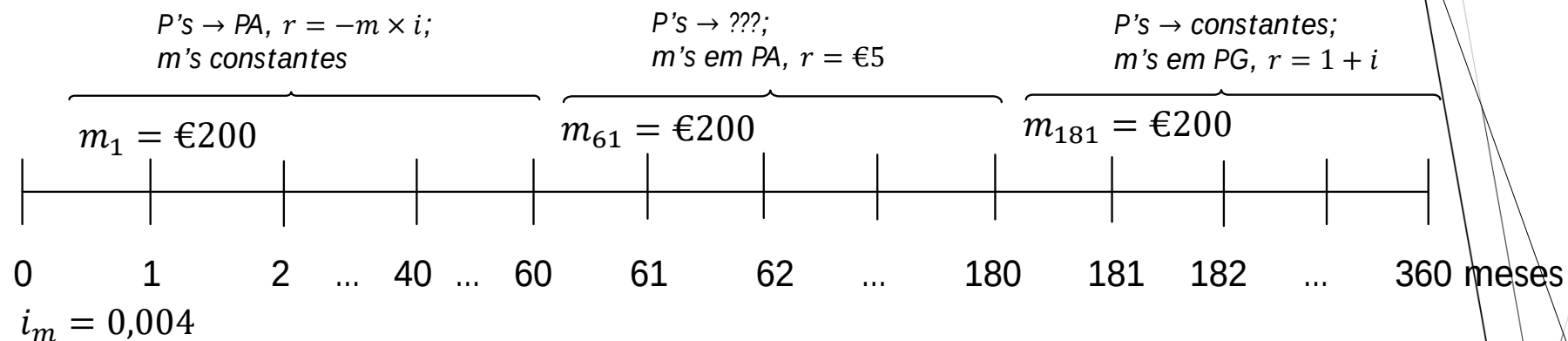
	Já entregues	Por entregar	
Pagamentos (P's)	1.1 ✓	1.2 	Capítulo 2
Parcelas de reembolso de capital (m's)	2.1	2.2	Capítulo 3

The background of the slide features several thin, light gray lines that intersect to form various geometric shapes, including triangles and polygons. These lines are primarily located on the right side of the slide, with some extending towards the center. The overall aesthetic is minimalist and modern.

2. Pelas parcelas de reembolso

2.1- Já entregues

$$C_0 = ?$$



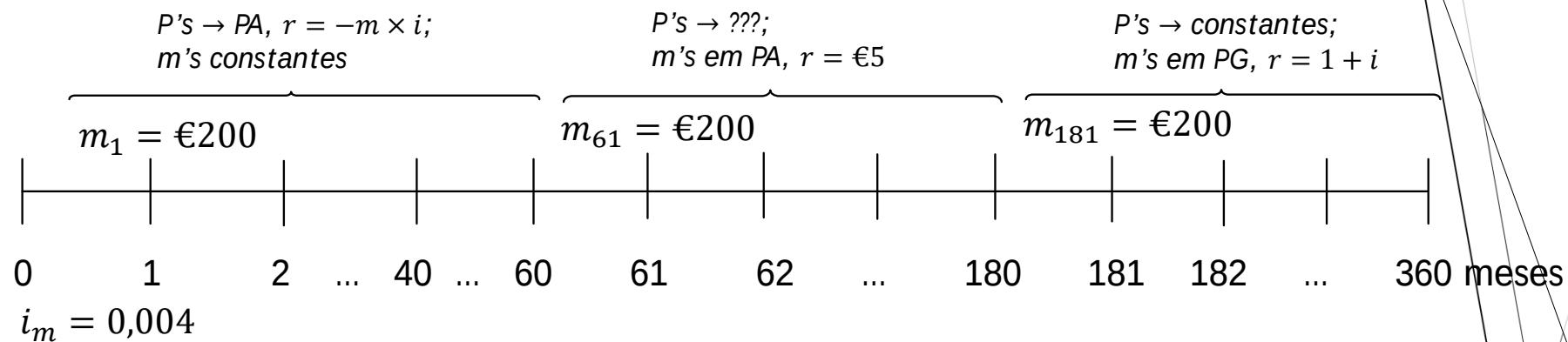
a) Capital em dívida, logo após o pagamento da 40.^a mensalidade?

$$C_{40} = C_0 - \underbrace{\sum_{k=1}^{40} m_k}_{Const} = C_0 - €200 \times 40$$



$$C_0 = \sum_{k=1}^{360} m_k = \underbrace{\sum_{k=1}^{60} m_k}_{Const} + \underbrace{\sum_{k=61}^{180} m_k}_{PA} + \underbrace{\sum_{k=181}^{360} m_k}_{PG}$$

$C_0 = ?$



a) Capital em dívida, logo após o pagamento da 40.^a mensalidade?

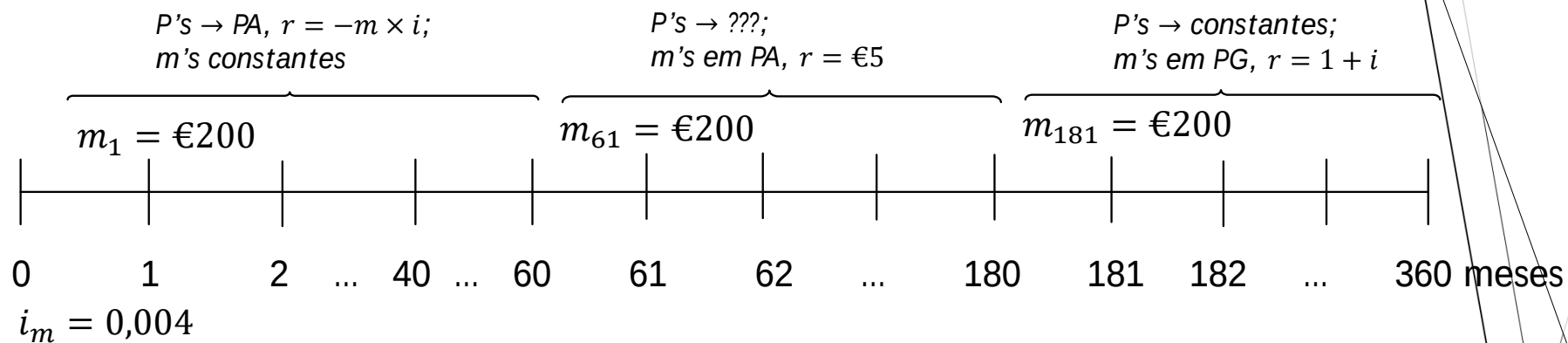
$$C_0 = \sum_{k=1}^{360} m_k = \underbrace{\sum_{k=1}^{60} m_k}_{Const} + \sum_{k=61}^{180} m_k + \sum_{k=180}^{360} m_k$$

Const



$$\text{€}200 \times (60 - 1 + 1)$$

$C_0 = ?$



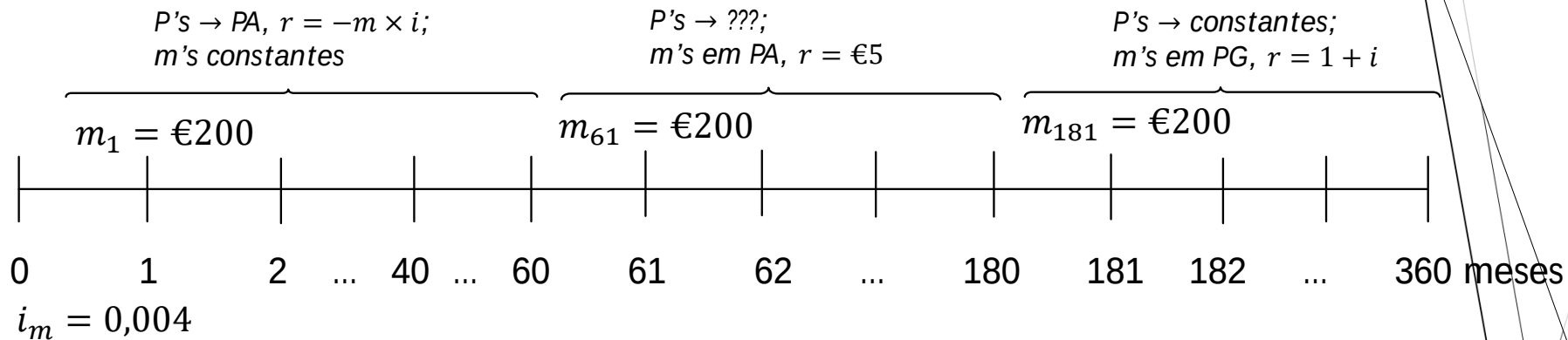
a) Capital em dívida, logo após o pagamento da 40.^a mensalidade?

$$C_0 = \sum_{k=1}^{360} m_k = \sum_{k=1}^{60} m_k + \underbrace{\sum_{k=61}^{180} m_k}_{PA} + \sum_{k=180}^{360} m_k$$

PA



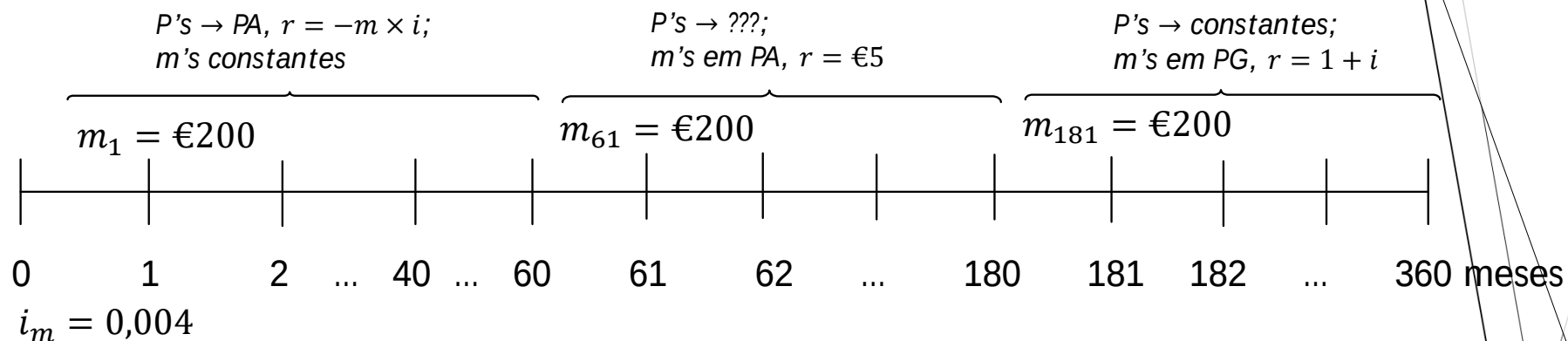
$$\sum_{k=p}^n m_k = \frac{m_p + m_n}{2} \times (n - p + 1)$$

$C_0 = ?$


a) Capital em dívida, logo após o pagamento da 40.^a mensalidade?

$$\begin{aligned}
 C_0 &= \sum_{k=1}^{360} m_k = \sum_{k=1}^{60} m_k + \underbrace{\sum_{k=61}^{180} m_k}_{PA} + \sum_{k=180}^{360} m_k \\
 &\quad \downarrow \\
 &= \frac{m_{61} + m_{180}}{2} \times (180 - 61 + 1) = \frac{€200 + \overbrace{(m_{61} + €5 \times (180 - 61))}^{m_{180}}}{2} \times 120 = \frac{€200 + €795}{2} \times 120
 \end{aligned}$$

$C_0 = ?$

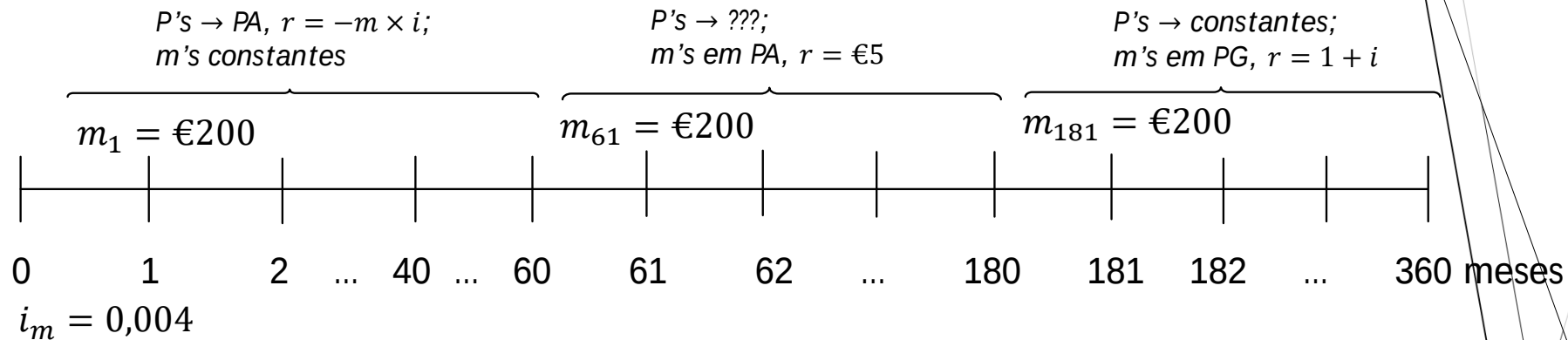


a) Capital em dívida, logo após o pagamento da 40.^a mensalidade?

$$C_0 = \sum_{k=1}^{360} m_k = \sum_{k=1}^{60} m_k + \sum_{k=61}^{180} m_k + \underbrace{\sum_{k=181}^{360} m_k}_{PG}$$

$$\downarrow$$

$$€200 \times \frac{1 - (1 + 0,004)^{(360-181+1)}}{1 - (1 + 0,004)}$$

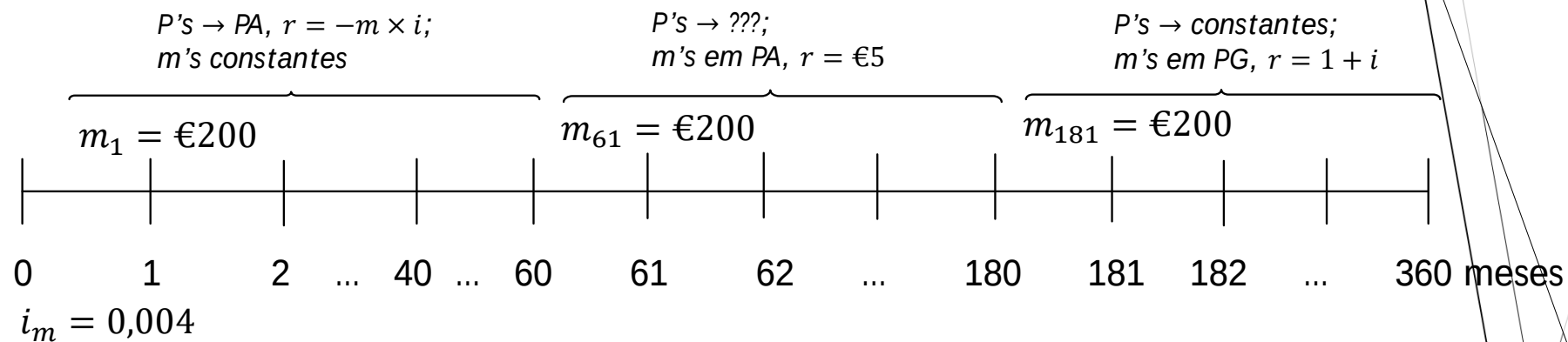
$C_0 = ?$


a) Capital em dívida, logo após o pagamento da 40.^a mensalidade?

$$C_0 = \sum_{k=1}^{360} m_k = \sum_{k=1}^{60} m_k + \sum_{k=61}^{180} m_k + \sum_{k=181}^{360} m_k$$

$$\begin{aligned}
 &\swarrow \quad \quad \downarrow \quad \quad \searrow \\
 &€200 \times 60 + \frac{€200 + €795}{2} \times 120 + €200 \times \frac{1 - (1 + 0,004)^{180}}{1 - (1 + 0,004)} = \boxed{€124.274,2405}
 \end{aligned}$$

$C_0 = ?$

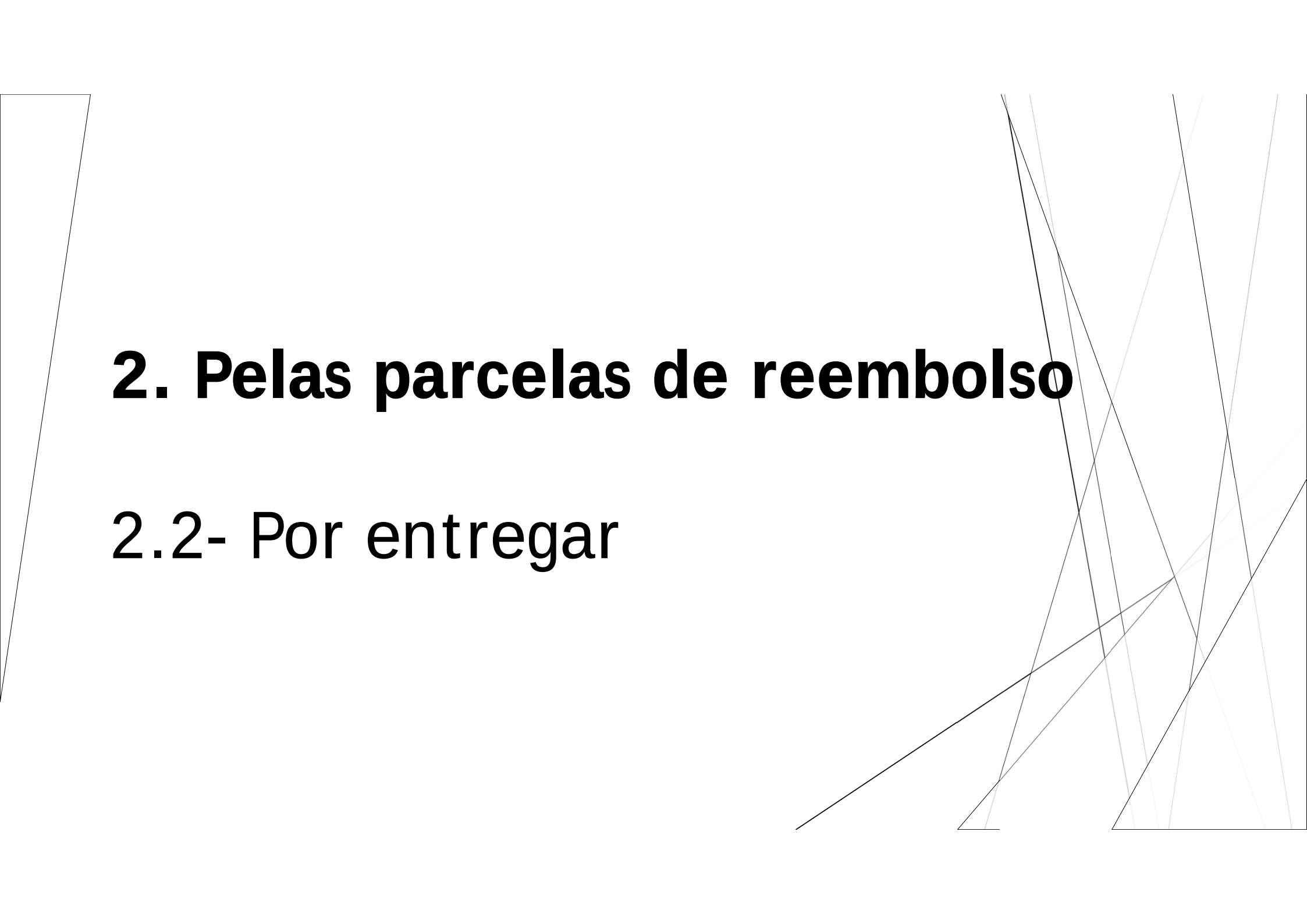


a) Capital em dívida, logo após o pagamento da 40.^a mensalidade?

$$C_{40} = C_0 - \sum_{k=1}^{40} m_k = C_0 - €200 \times 40 = €124.274,2405 - €200 \times 40 = \boxed{€116.274,2405}$$

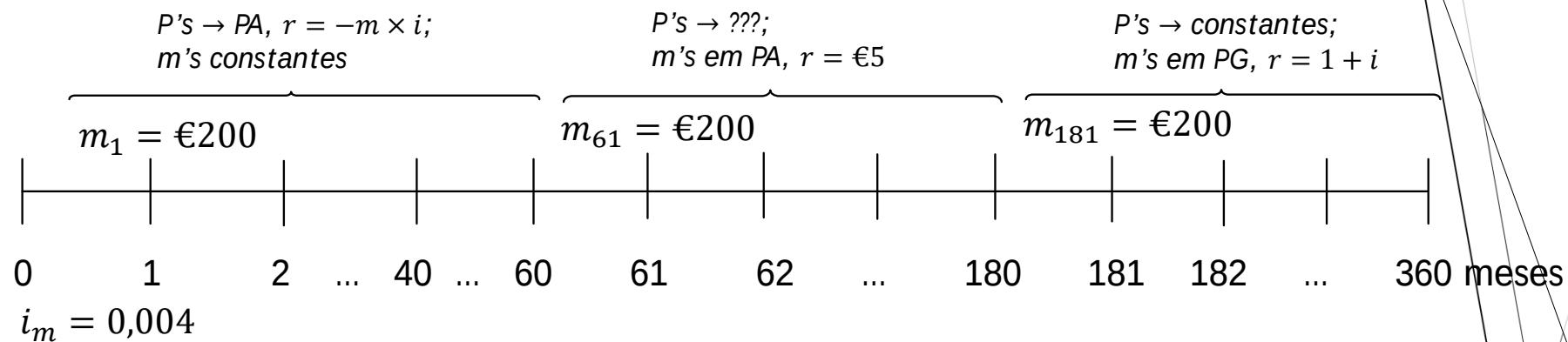
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The background features several thin, light gray lines that intersect to form various geometric shapes, including triangles and polygons. These lines are primarily located on the right side of the slide, with some extending towards the center.

2. Pelas parcelas de reembolso

2.2- Por entregar

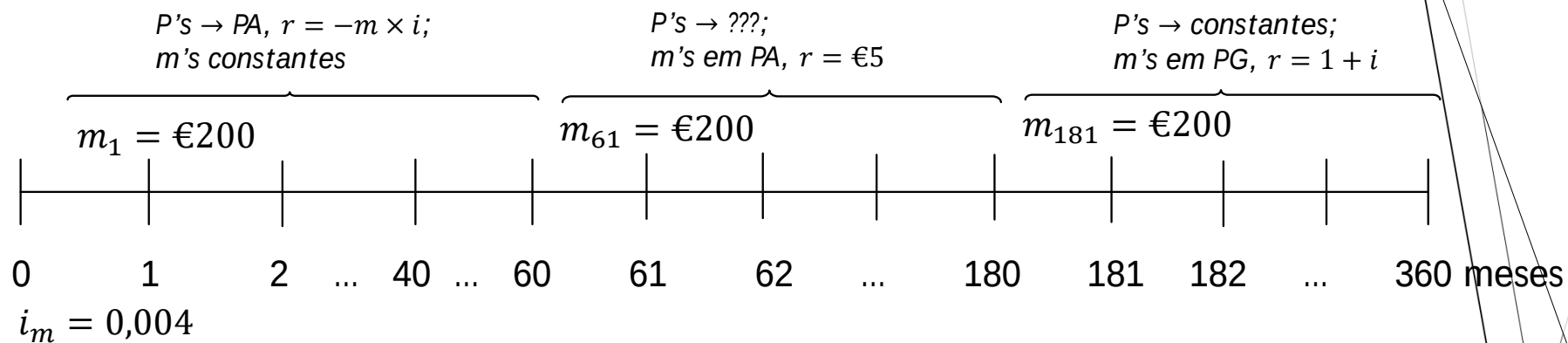
$C_0 = ?$


a) Capital em dívida, logo após o pagamento da 40.^a mensalidade?

$$C_t = \sum_{k=t+1}^n m_k$$

$$C_{40} = \sum_{k=41}^{360} m_k = \underbrace{\sum_{k=41}^{60} m_k}_{Const} + \underbrace{\sum_{k=61}^{180} m_k}_{PA} + \underbrace{\sum_{k=181}^{360} m_k}_{PG}$$

$C_0 = ?$

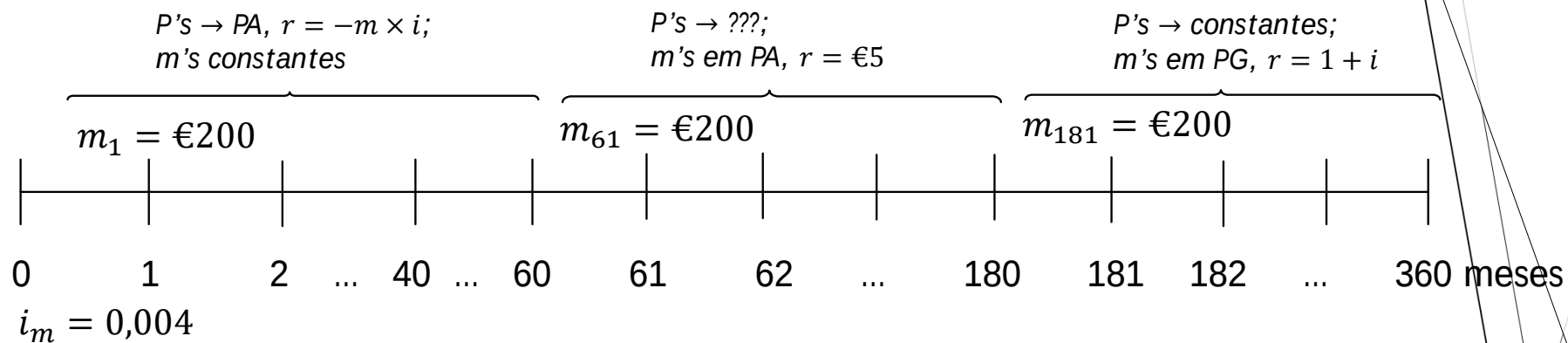


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$\downarrow$
 $€200 \times (60 - 41 + 1)$

$C_0 = ?$



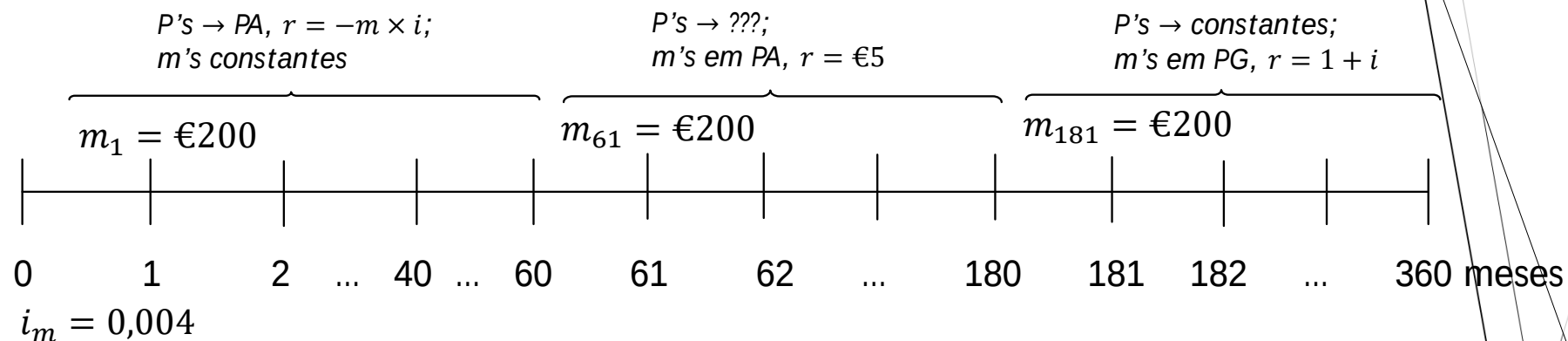
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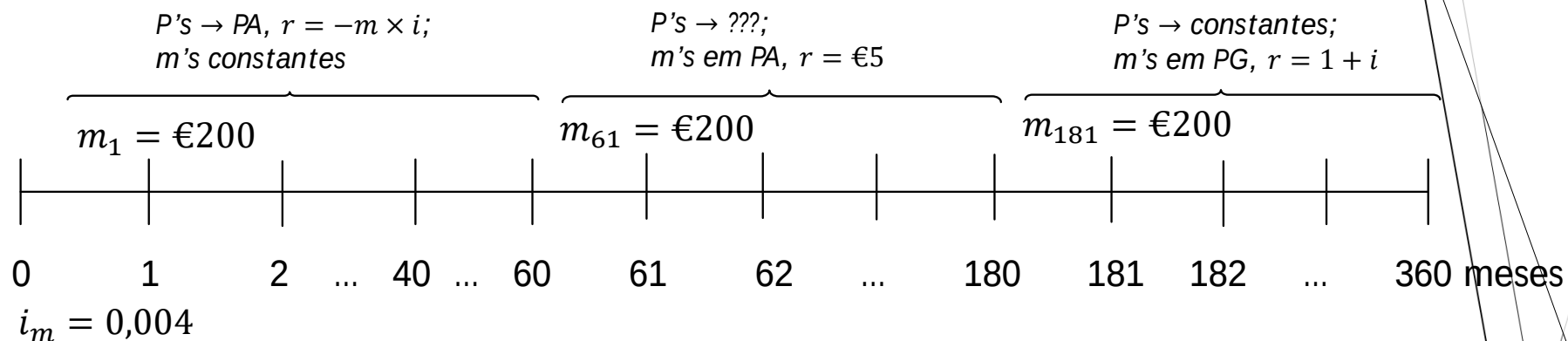
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$C_0 = ?$


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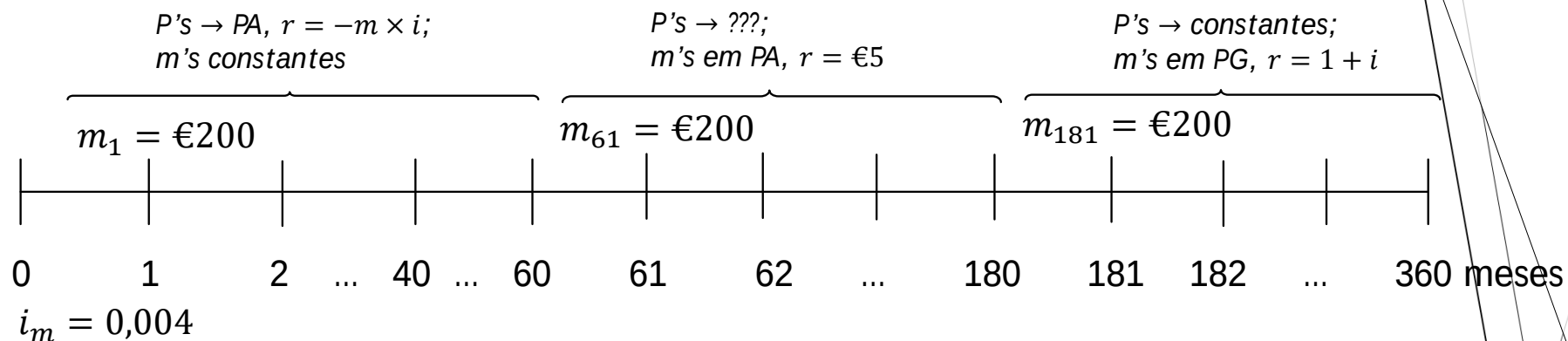


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$$\downarrow$$

$$\text{€}200 \times \frac{1 - (1 + 0,004)^{(360-181+1)}}{1 - (1 + 0,004)}$$

$C_0 = ?$


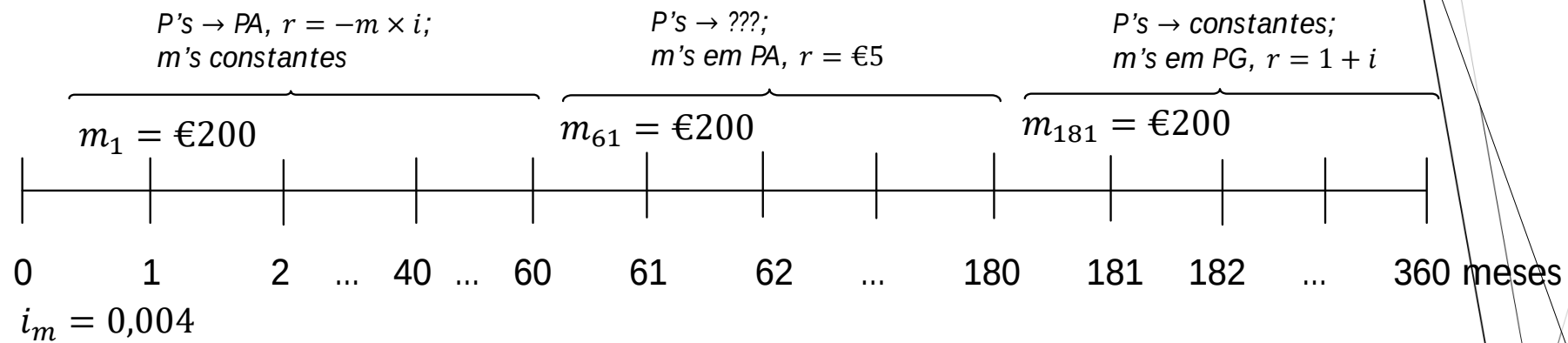
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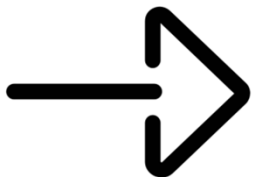
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Parcelas de reembolso de capital (m's)	2.1 ✓	2.2 ✓	Capítulo 3

$C_0 = ?$


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Cálculo de capitais em dívida



Utilização de folha de cálculo

Capítulo III – Serviço de dívida