

Strip Tree: Representação Hierárquica para aproximação de Curvas

Cesar Arturo Sanchez Pena Matheus
Pereira Bento da Costa

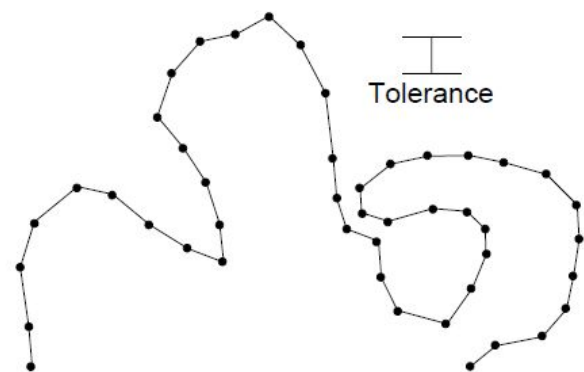
Professor Gilberto Ribeiro
Computação Aplicada
2020

Introdução

- A extração de características de uma determinada fonte geográfica e a forma podem representada de um modo simples, mas mantendo certas informações relevantes, conhecida como generalização cartográfica.
 - O algoritmo de Douglas–Peucker
- Grande volume de dados (embora não seja necessário), precisará de uma metodologia para realizar operações de forma mais eficiente.
 - Strip-tree
 - Comprimento, intersecção, conteúdo, área e etc.

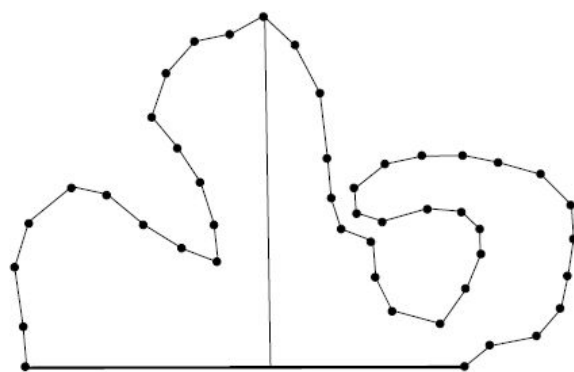
Algoritmo de Douglas–Peucker

- Importante: Mapeamento e a extração de características de dados detalhados
- Douglas-Peucker
- Simplifica
- $O(n \log n)$

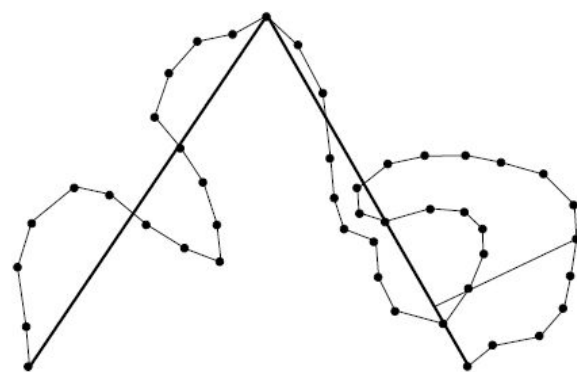


Tolerance

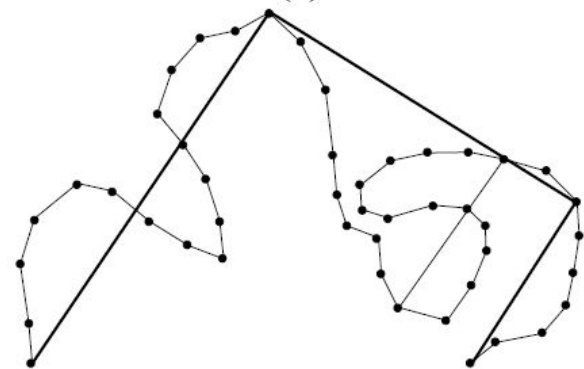
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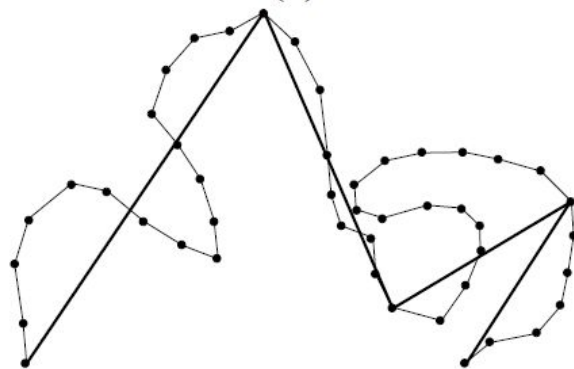
(b)



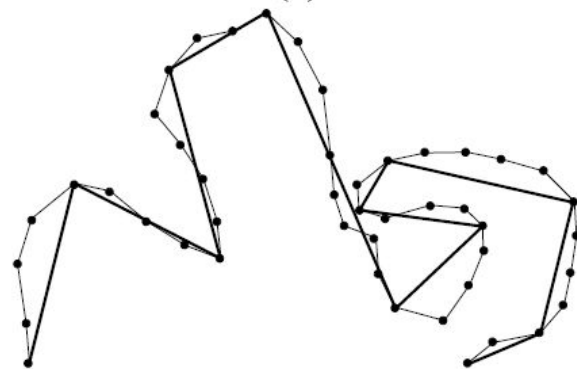
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(d)



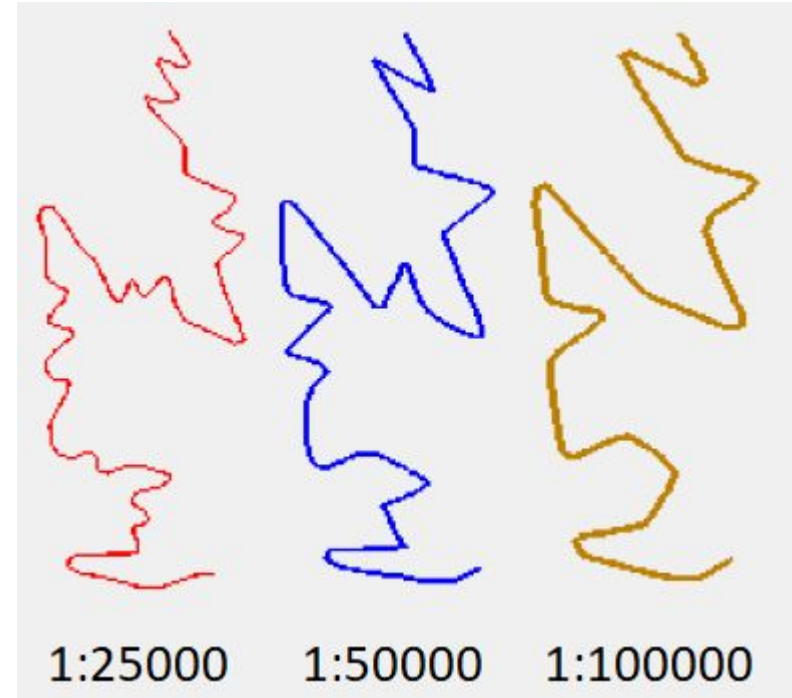
(e)



(f)

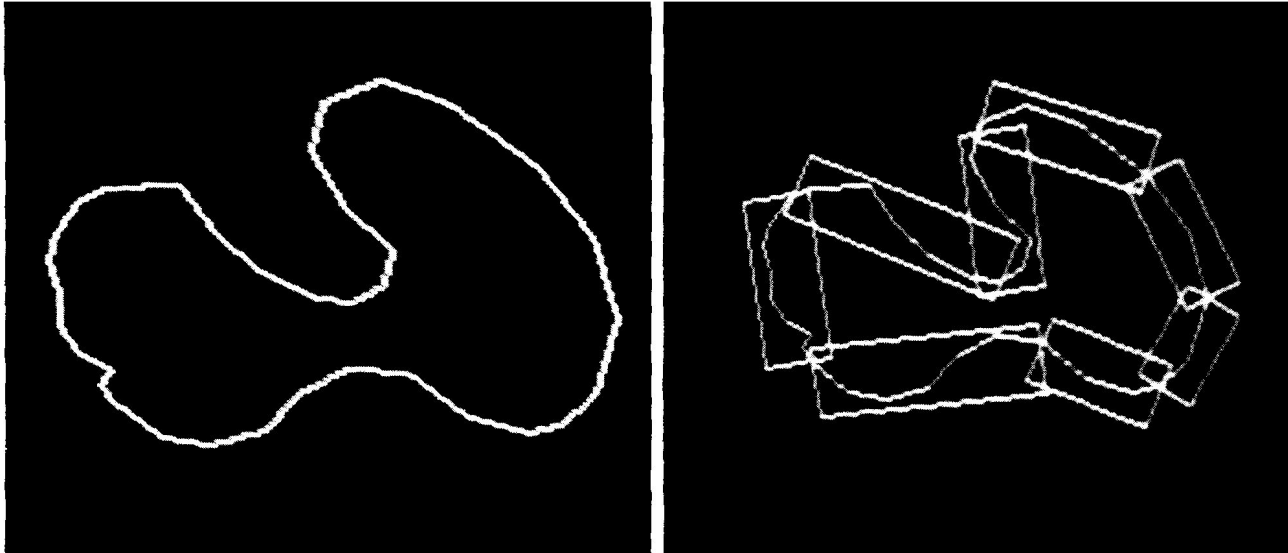
Generalização Cartográfica

- Consiste em reduzir a escala de um mapa de base e adaptar todos os seus elementos a uma nova escala.
- Produz um mapa claramente legível e interpretá-lo a partir de informação de base considerada excessivamente abundante ou densa.



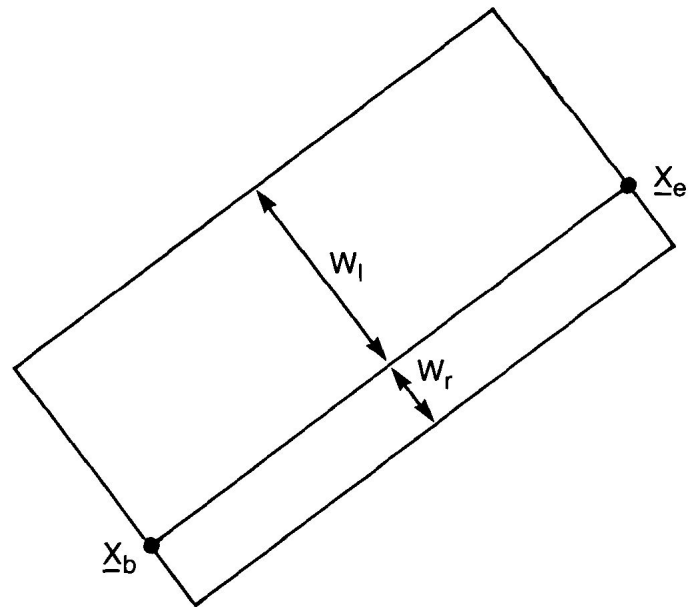
Strip Tree

- Representar cada parte da curva por um retângulo delimitação (chamado Strip) que contém esse segmento.



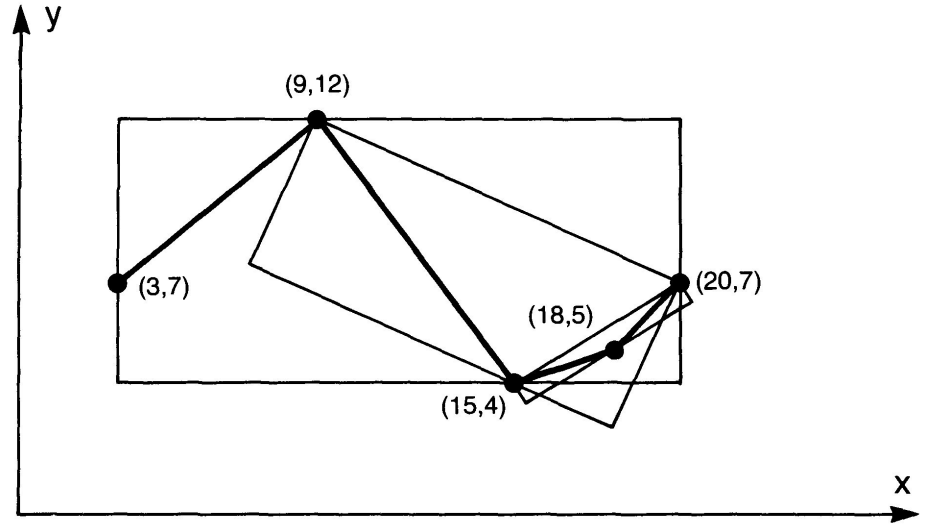
Strip Tree

- Árvore binárias
- Níveis inferiores = melhores resoluções
- Nó



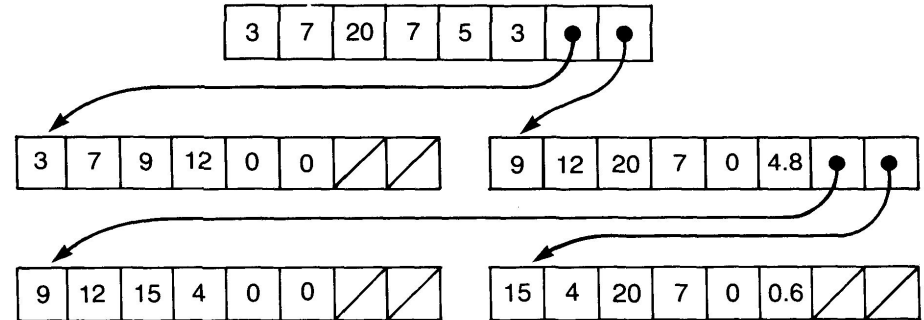
x_s	y_s	x_e	y_e	w_l	w_r
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Strip Tree

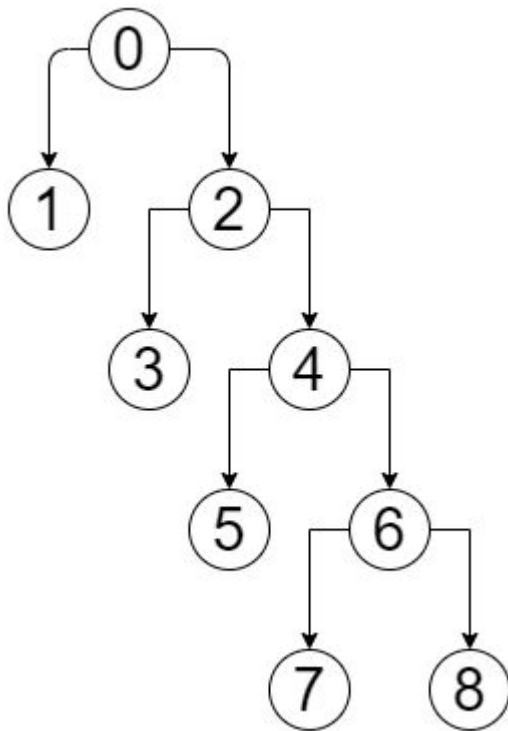


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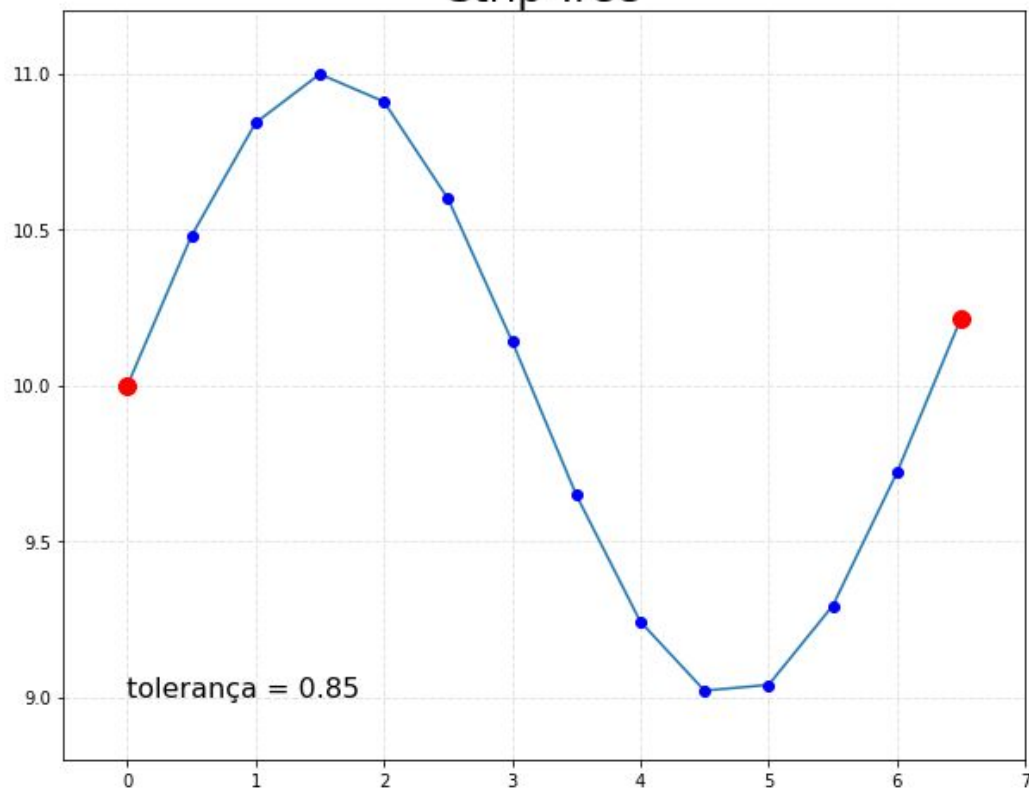
x_b	y_b	x_e	y_e	w_l	w_r		
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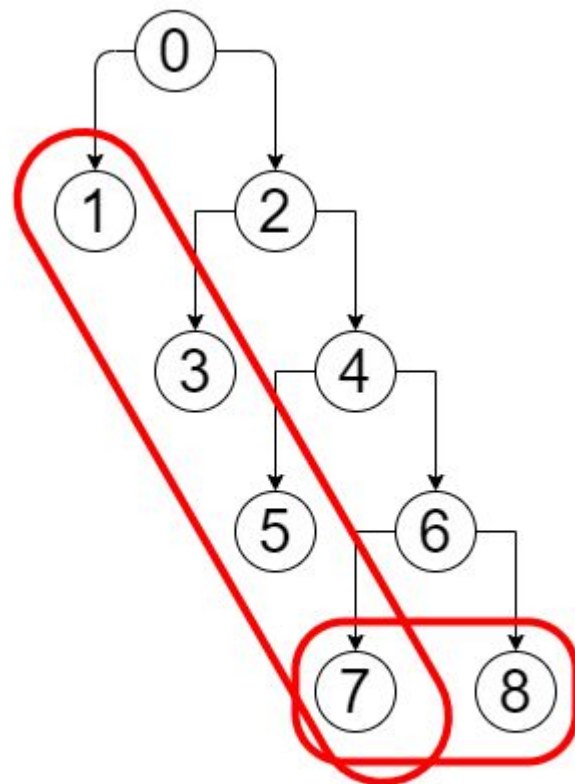
Strip-Tree



Strip-Tree

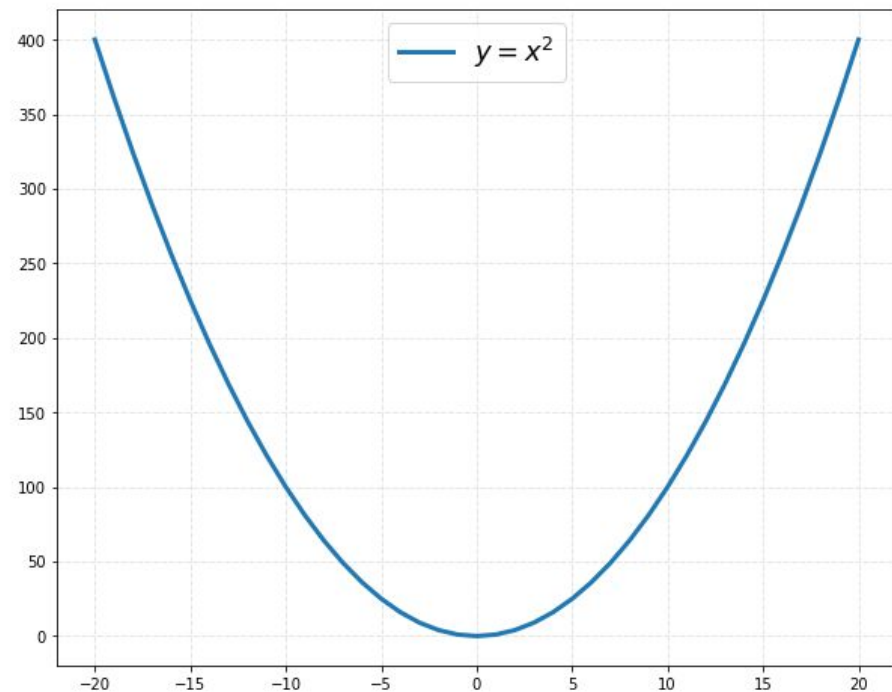
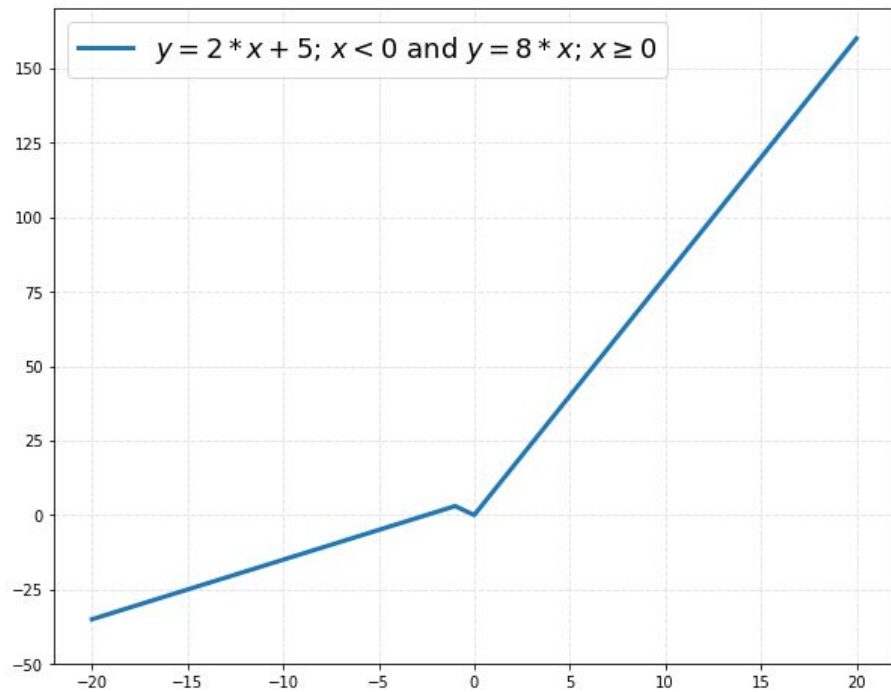


Strip-Tree

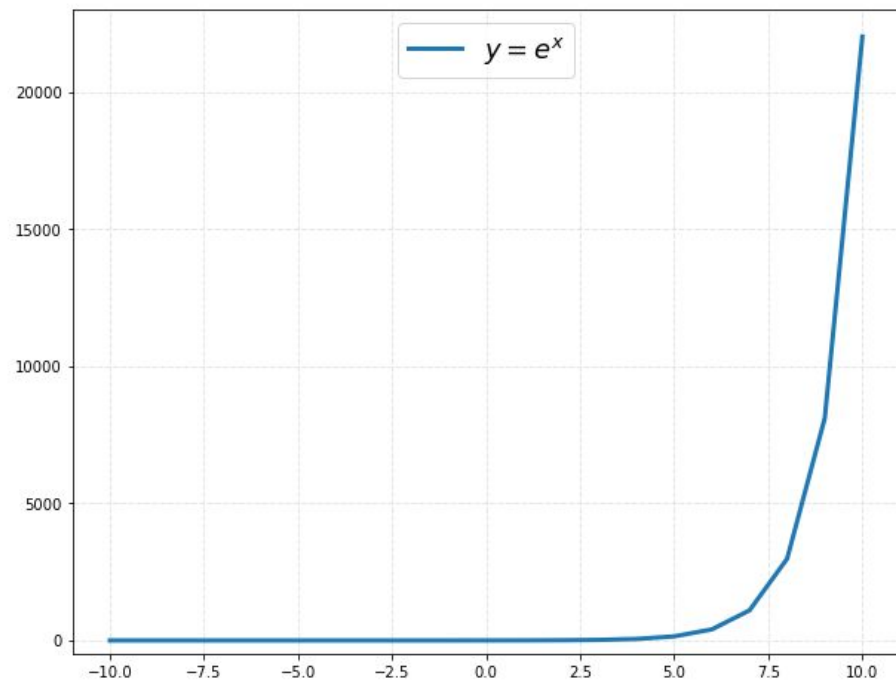
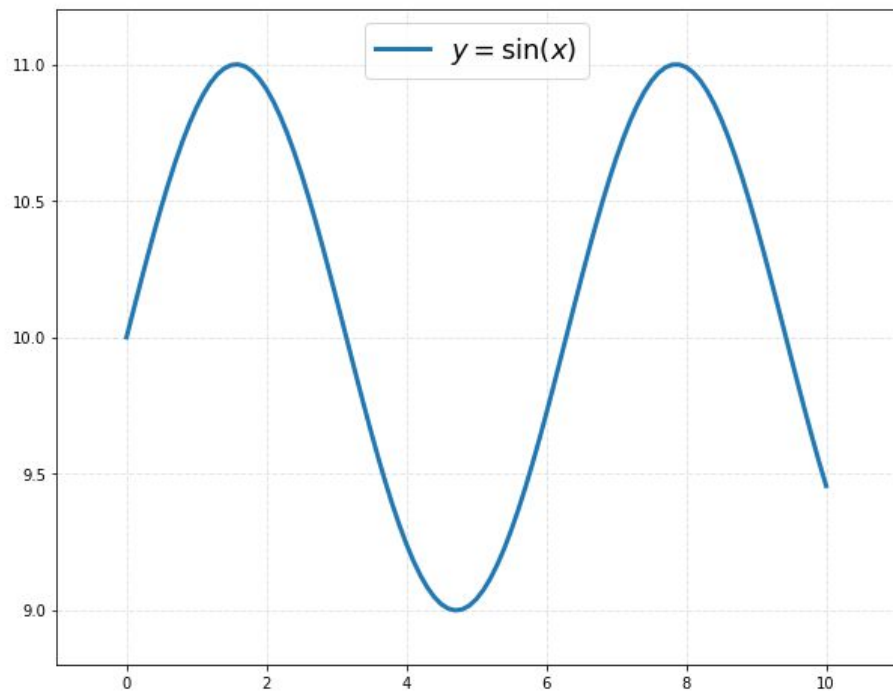


Comprimento

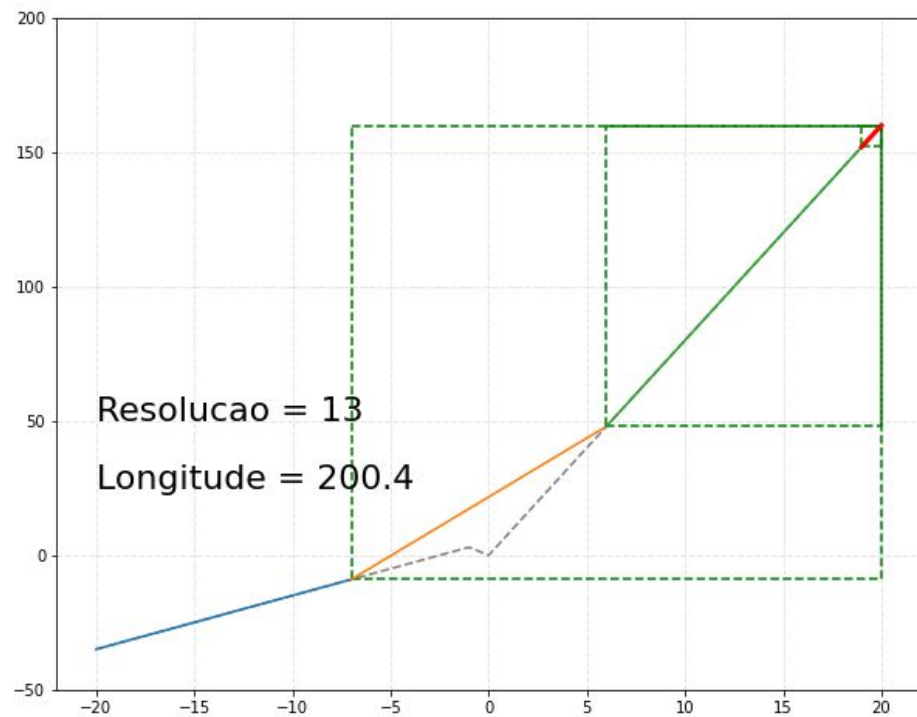
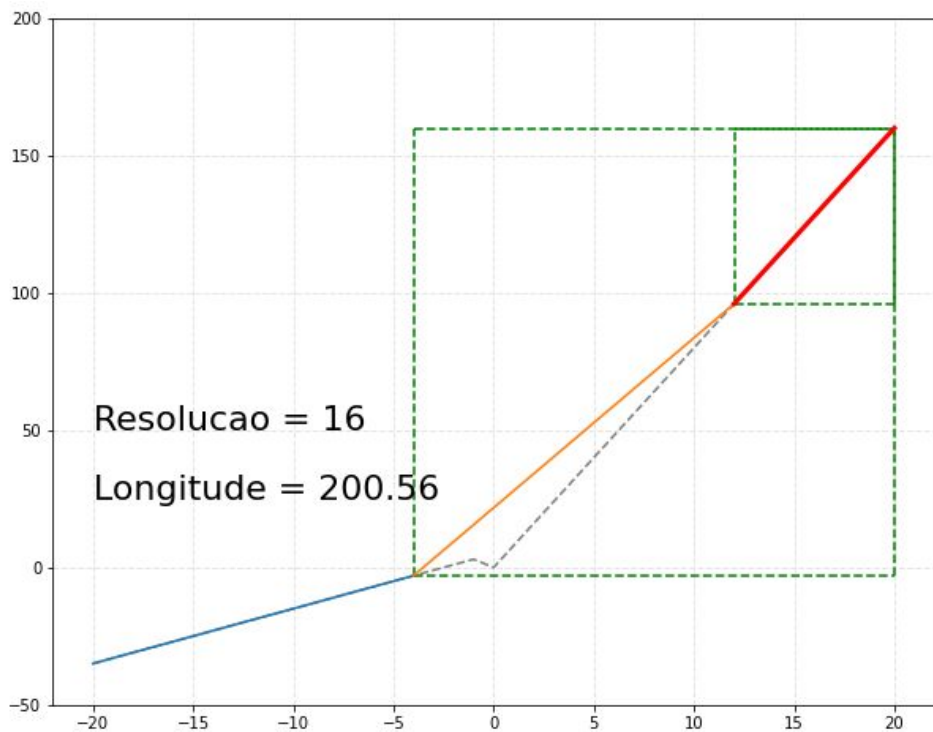
Testes



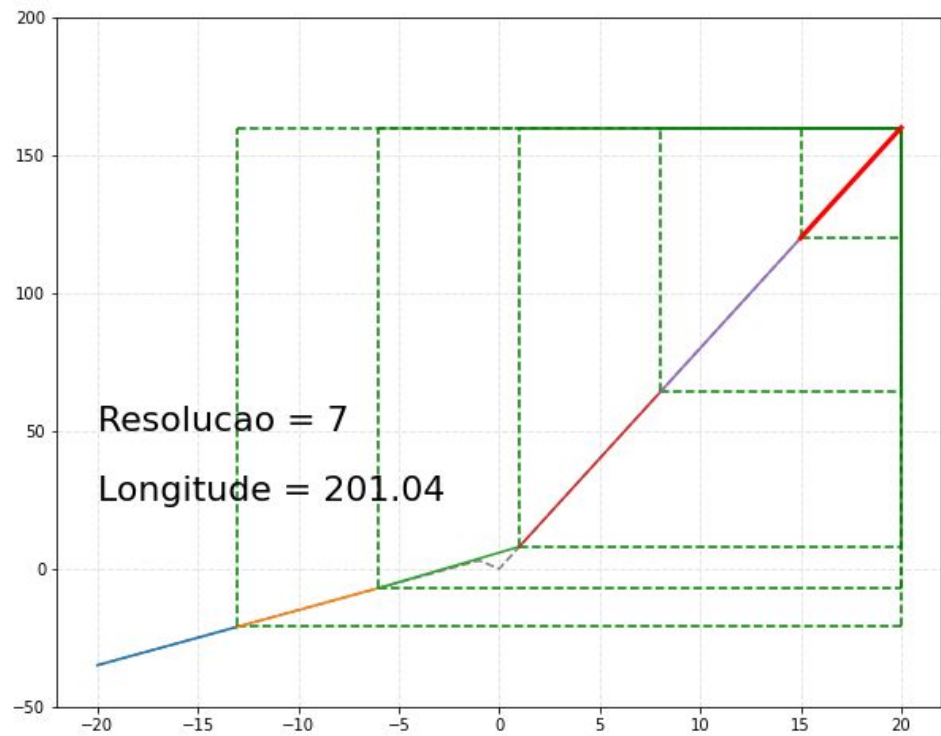
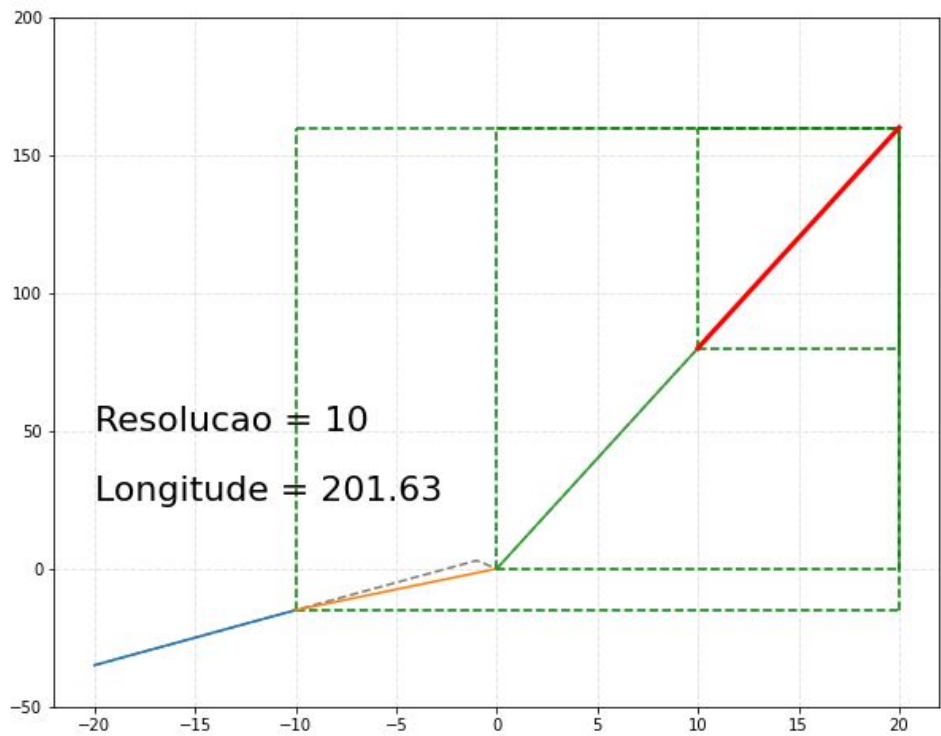
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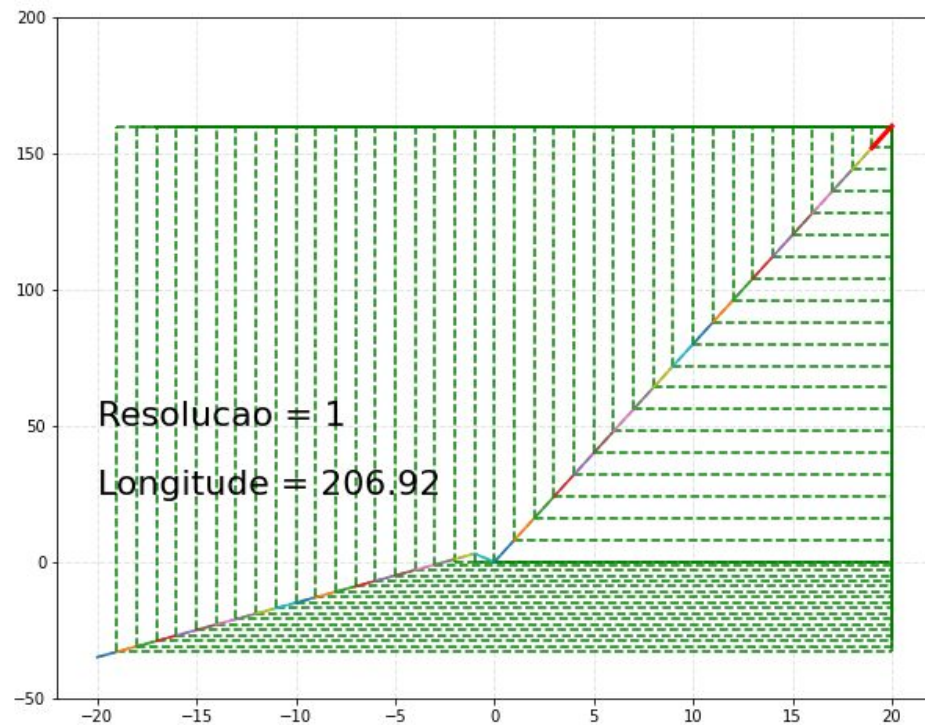
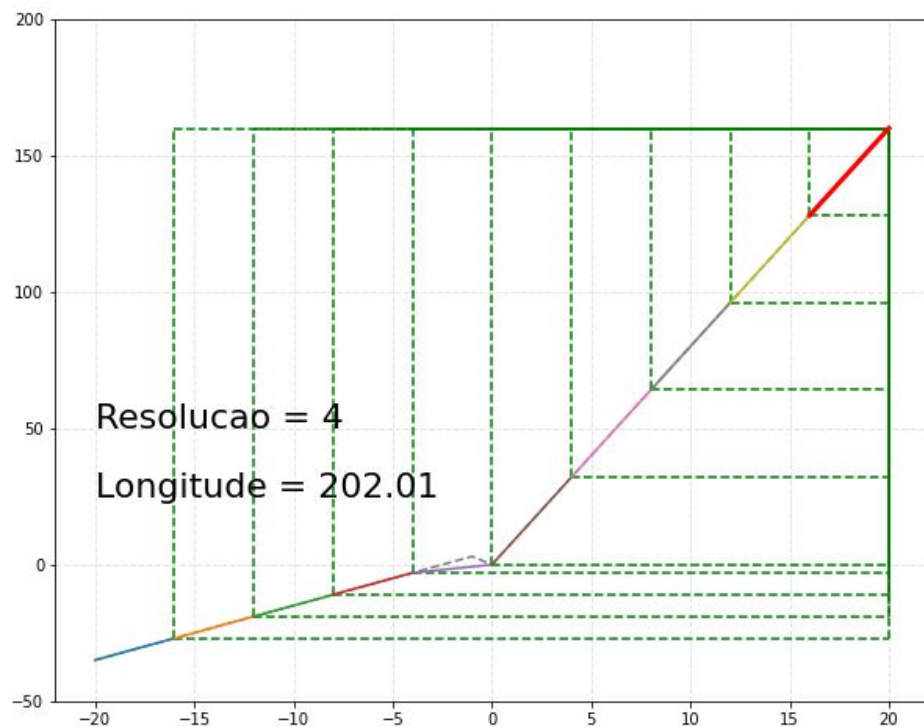
Resultados



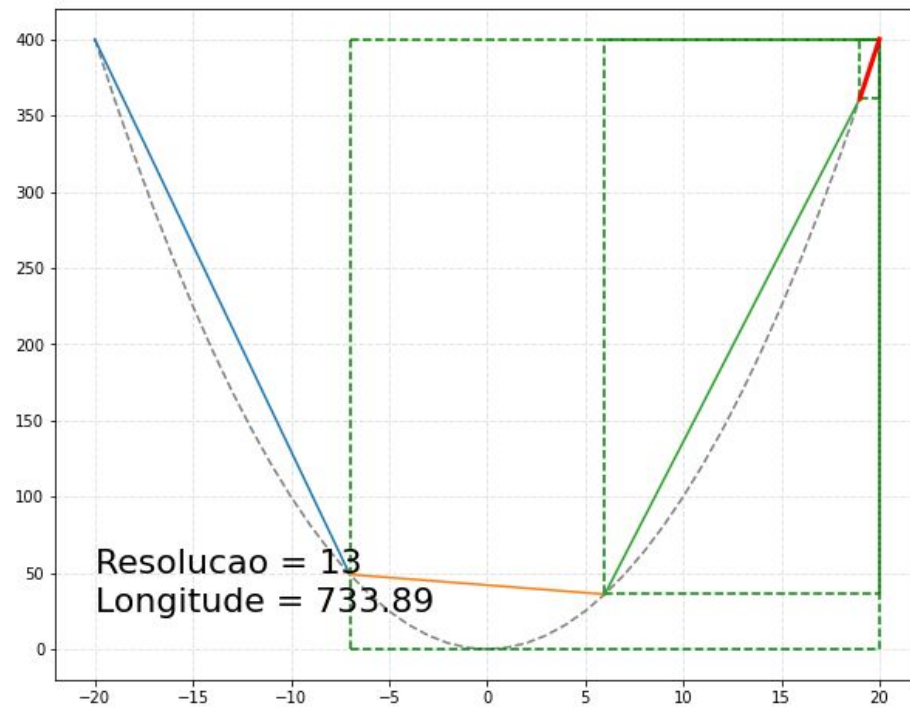
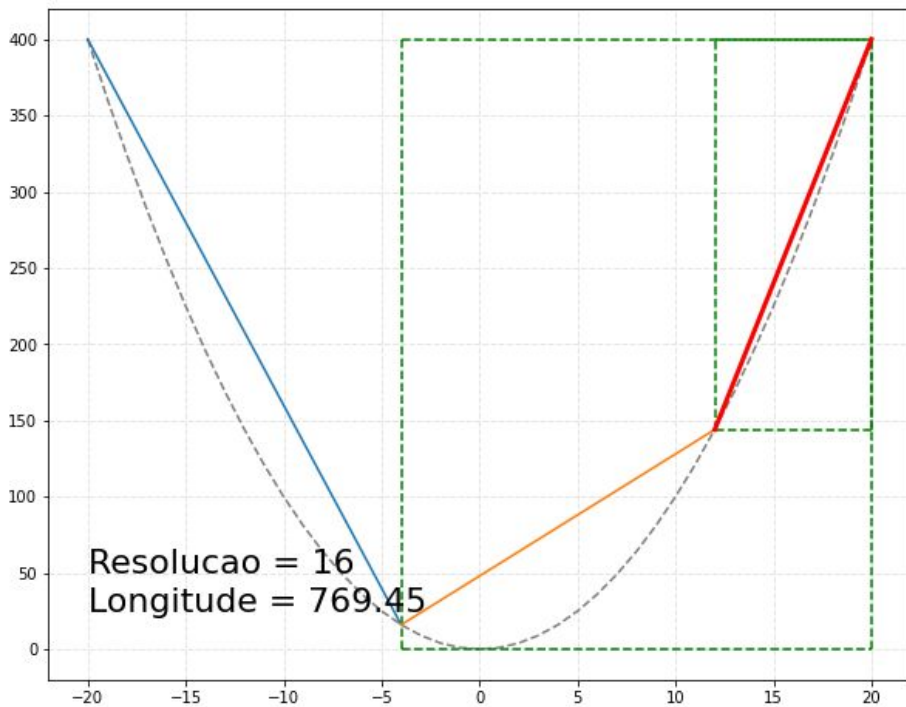
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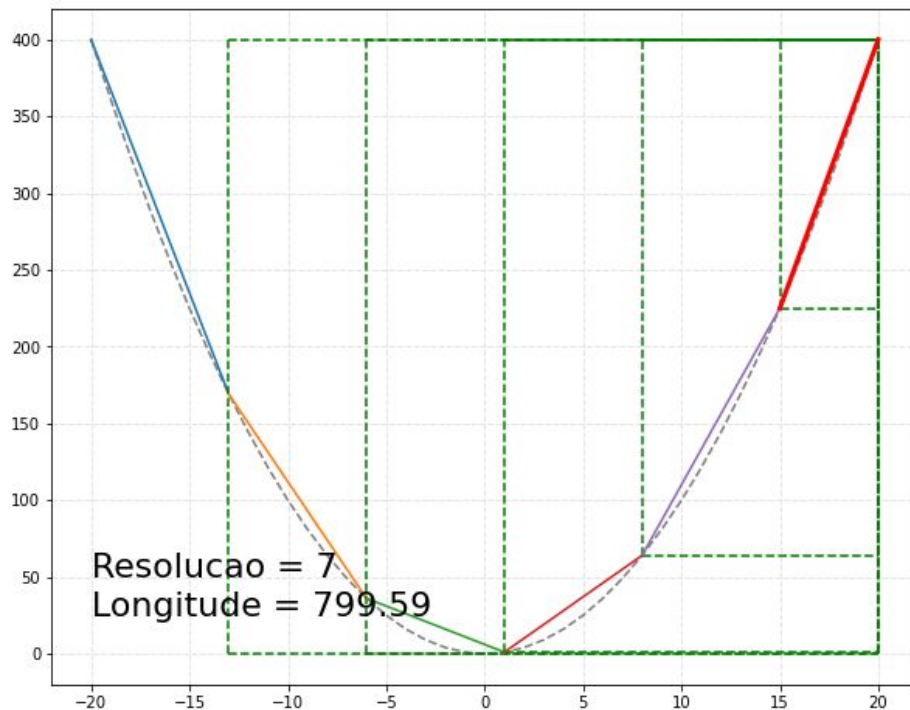
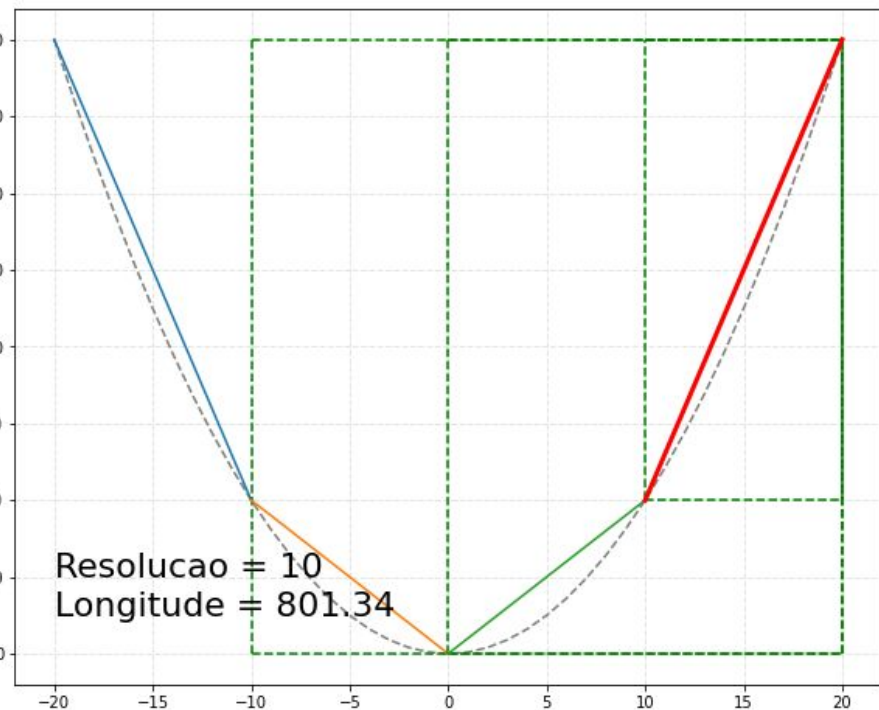
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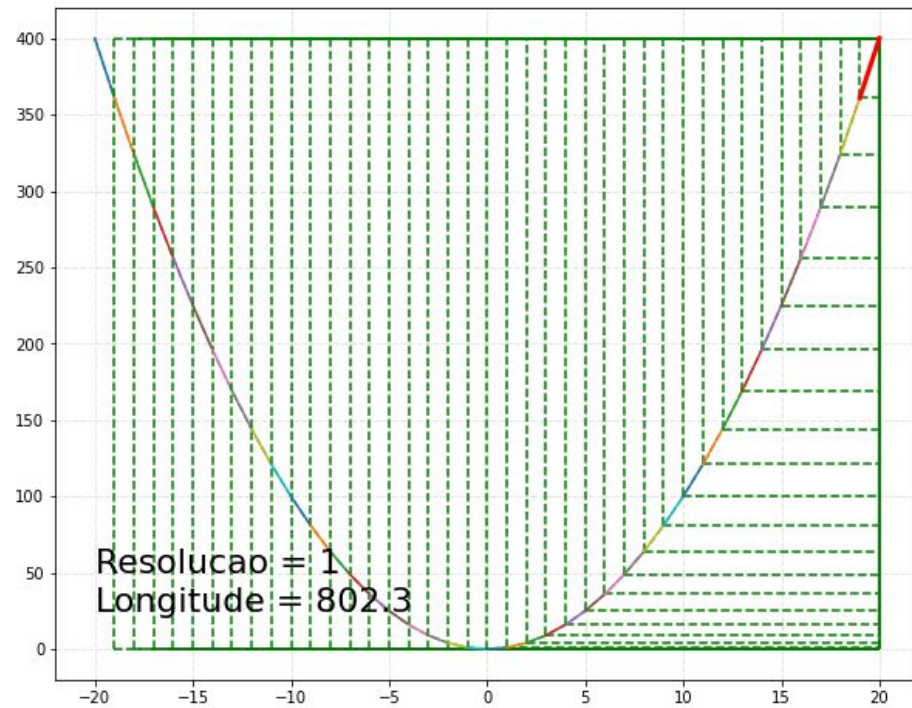
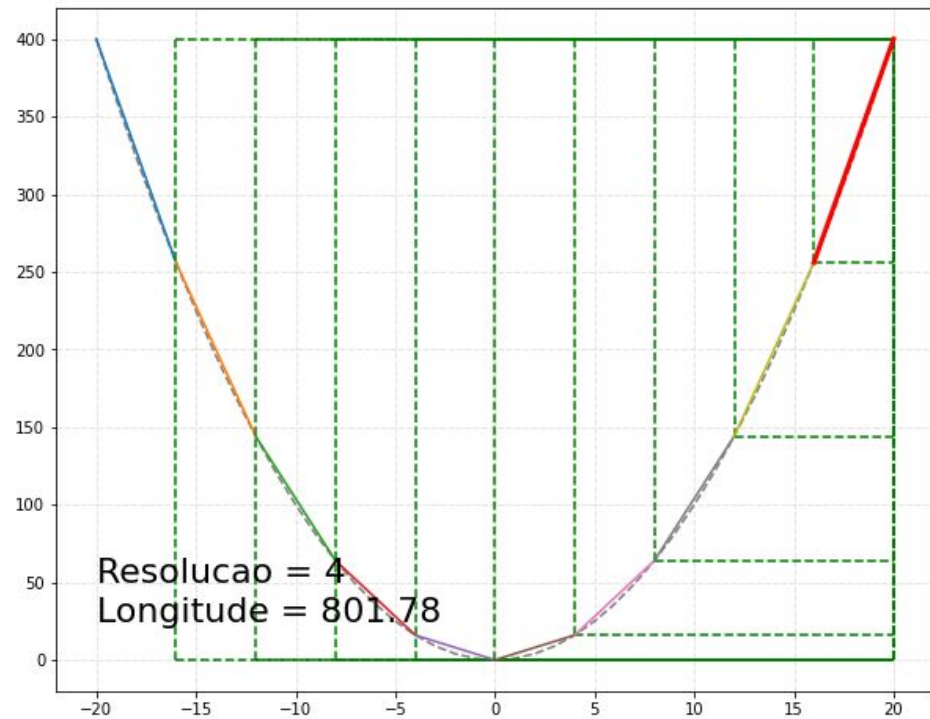
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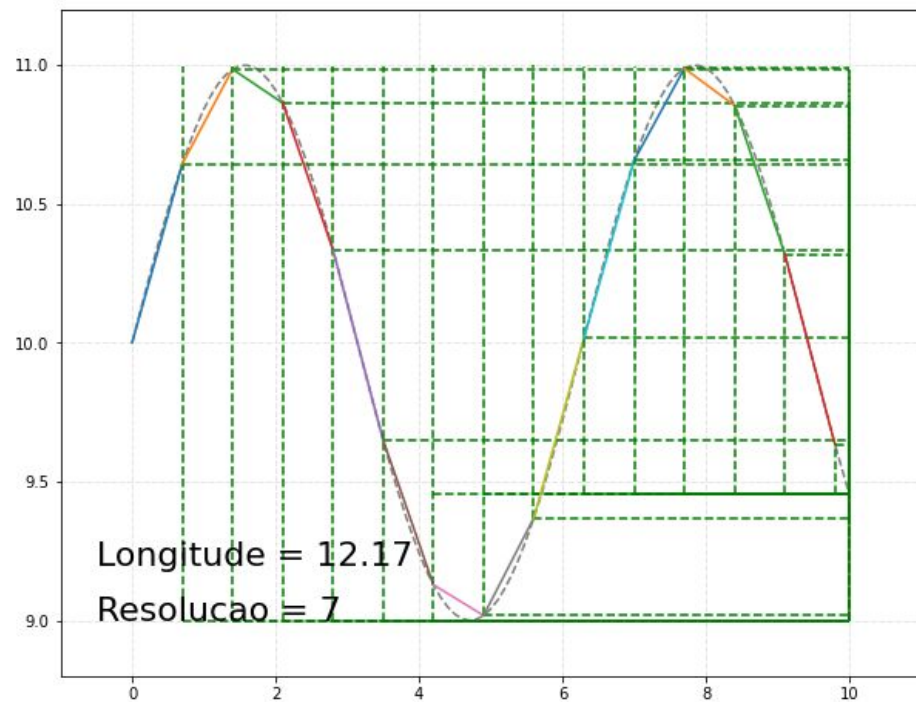
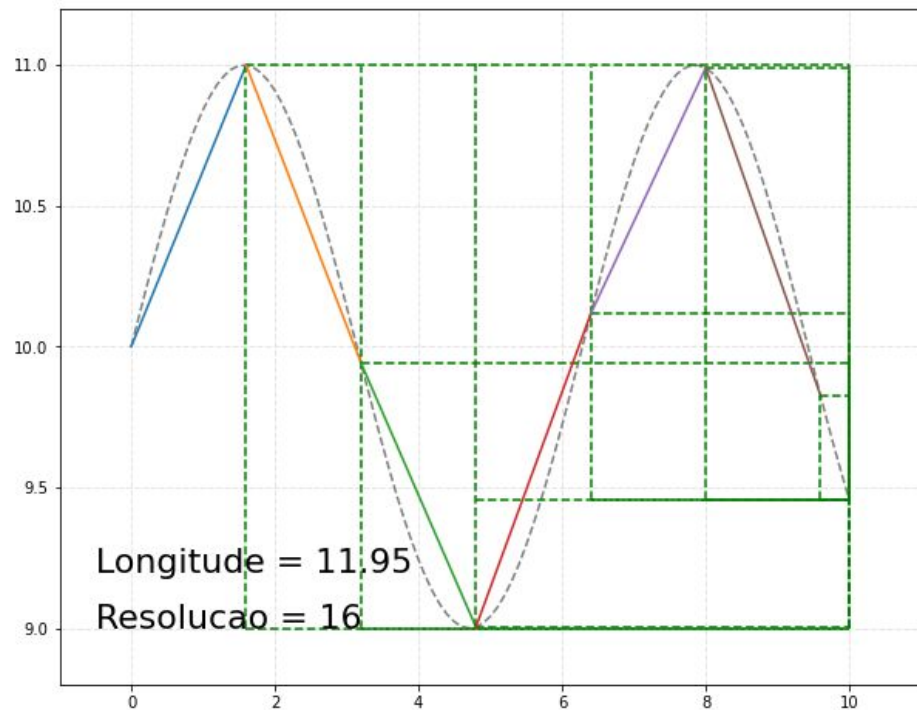
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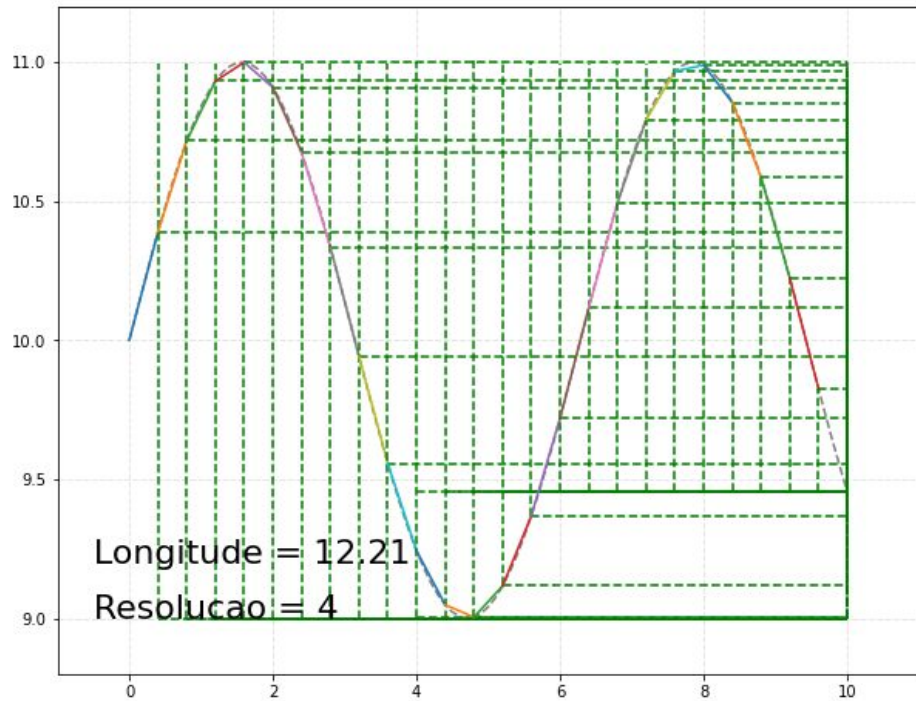
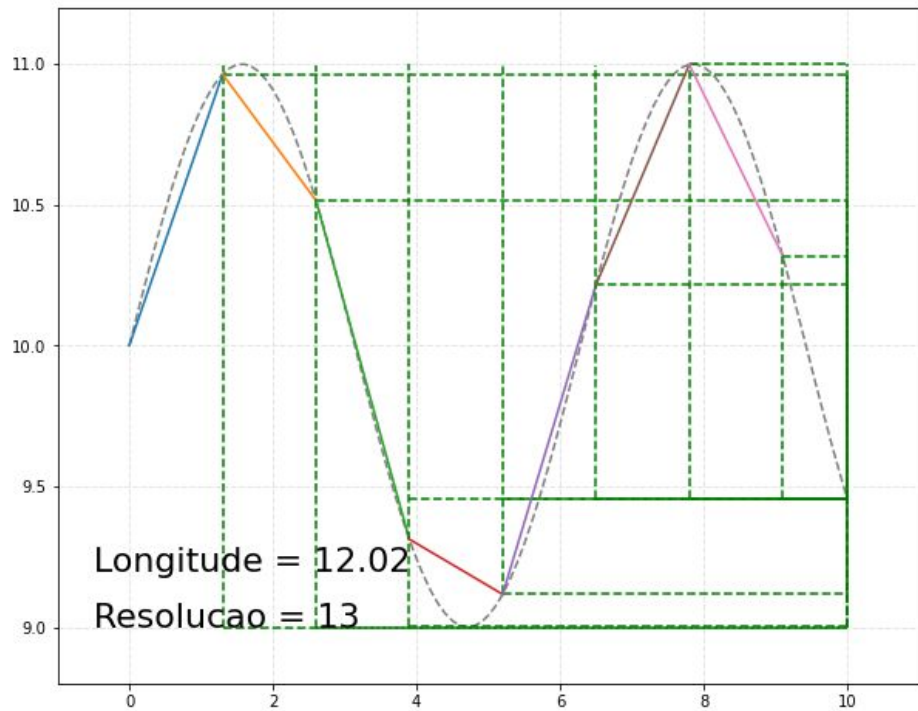


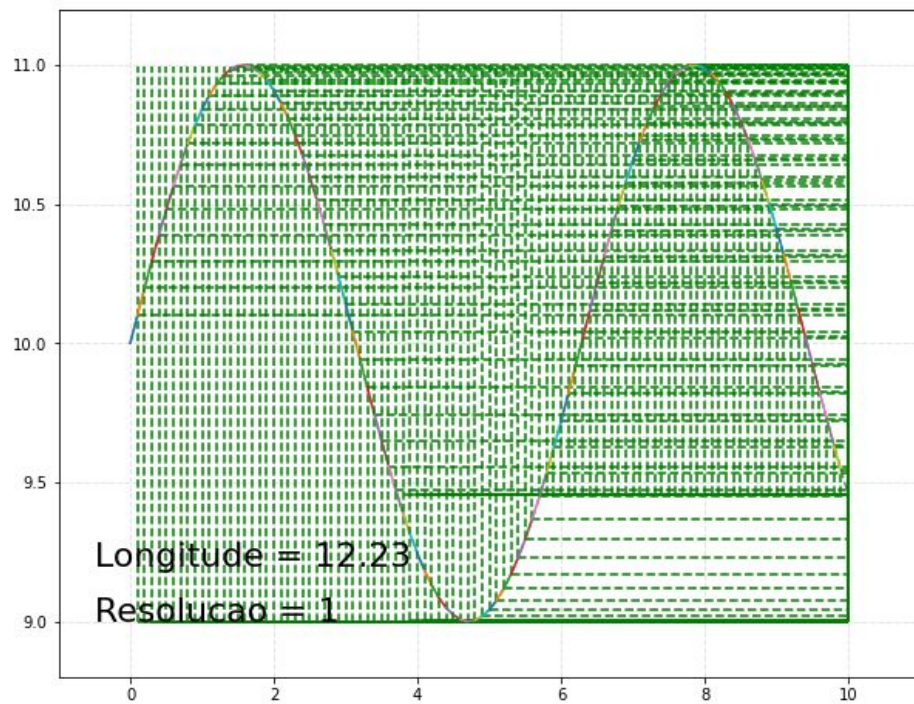
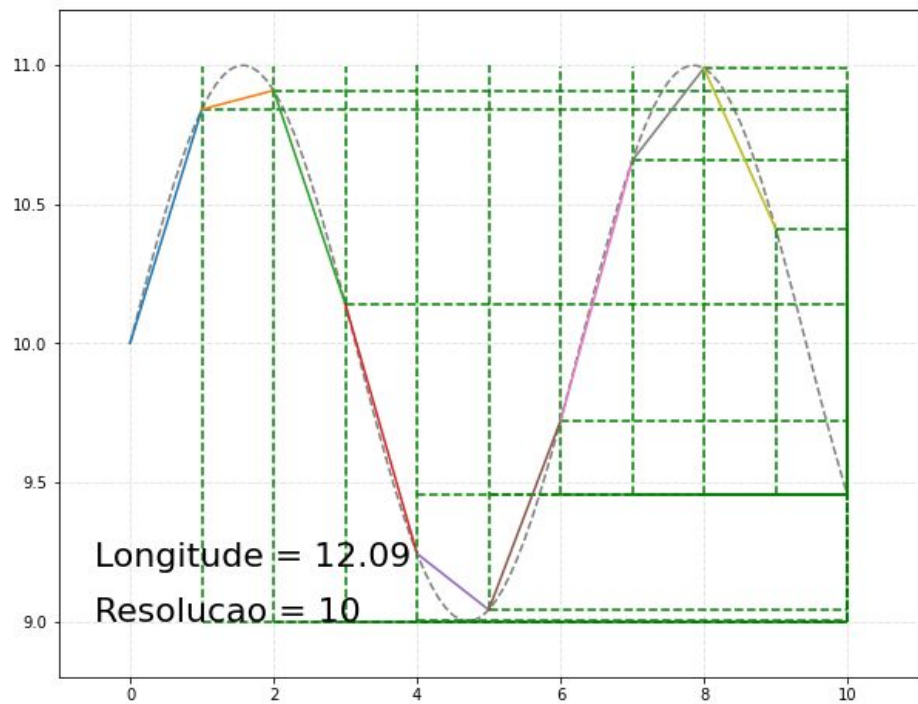
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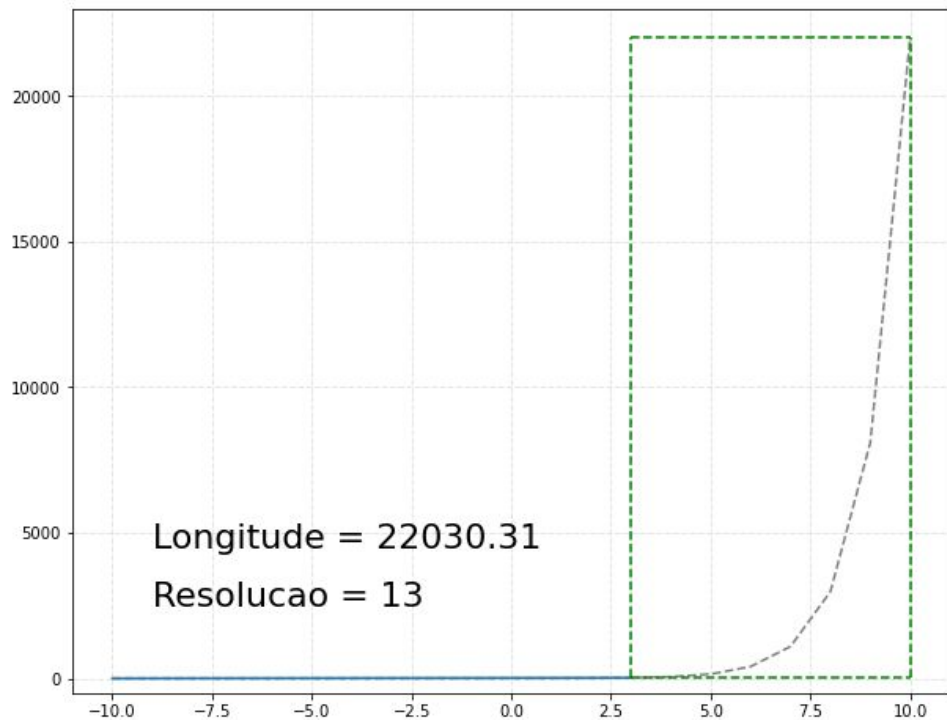
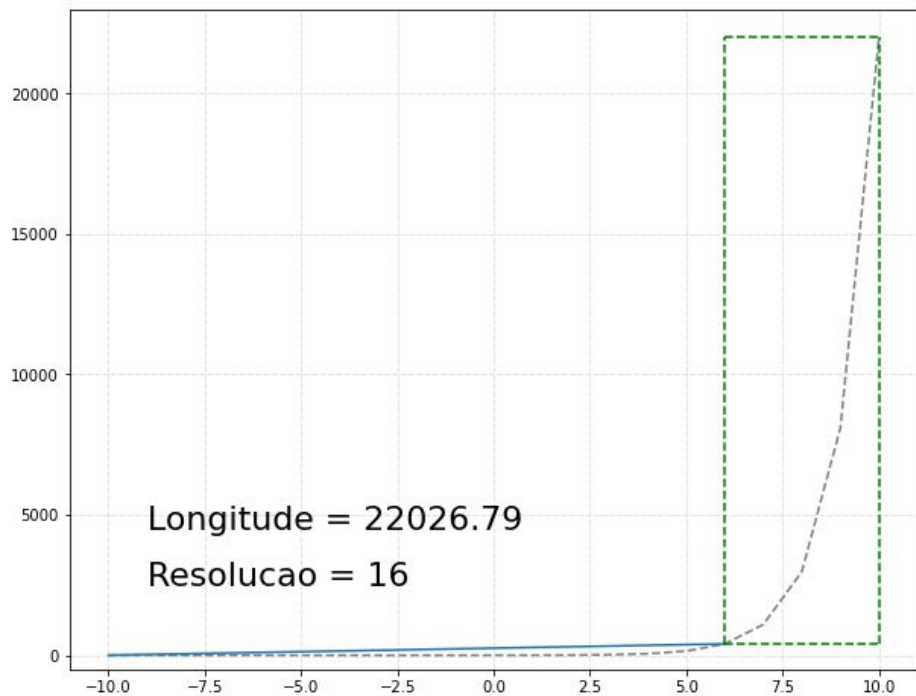
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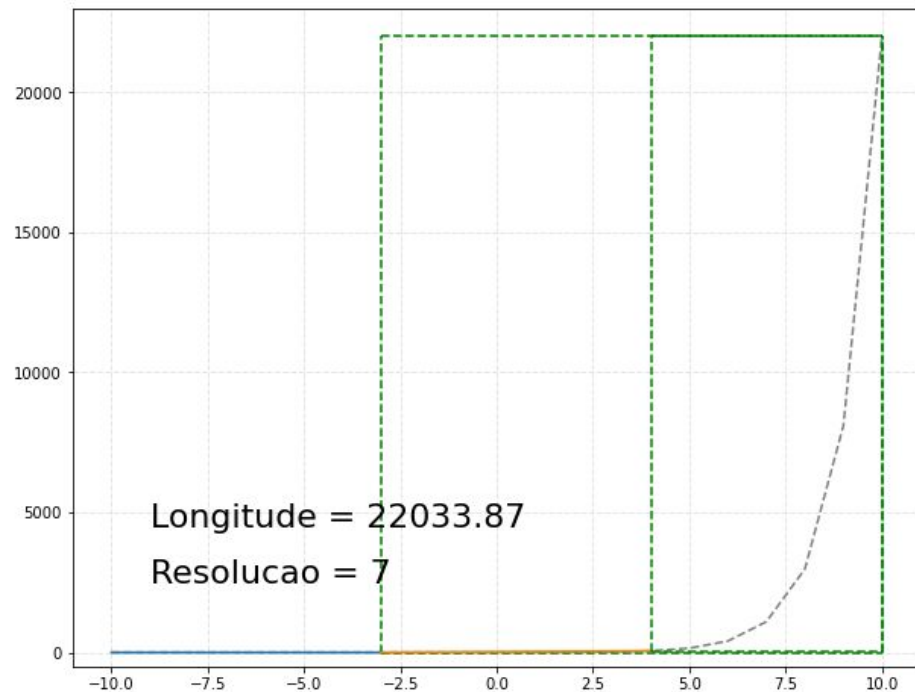
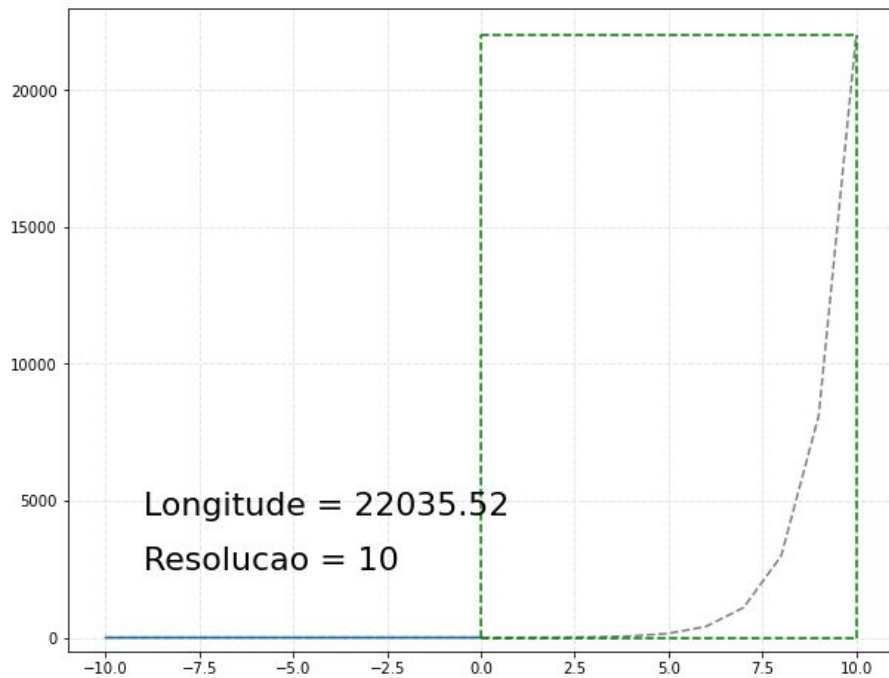




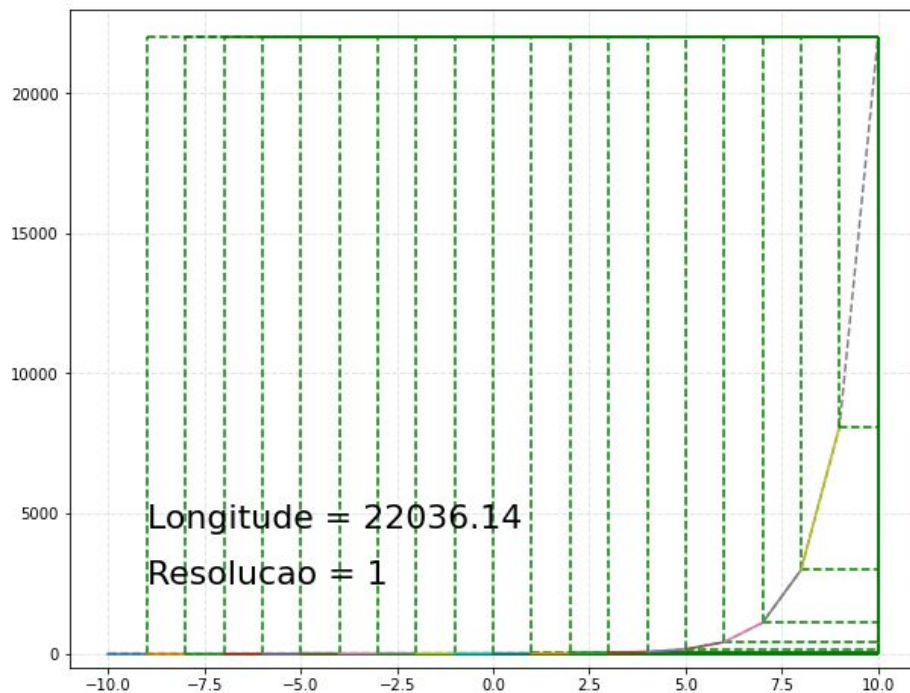
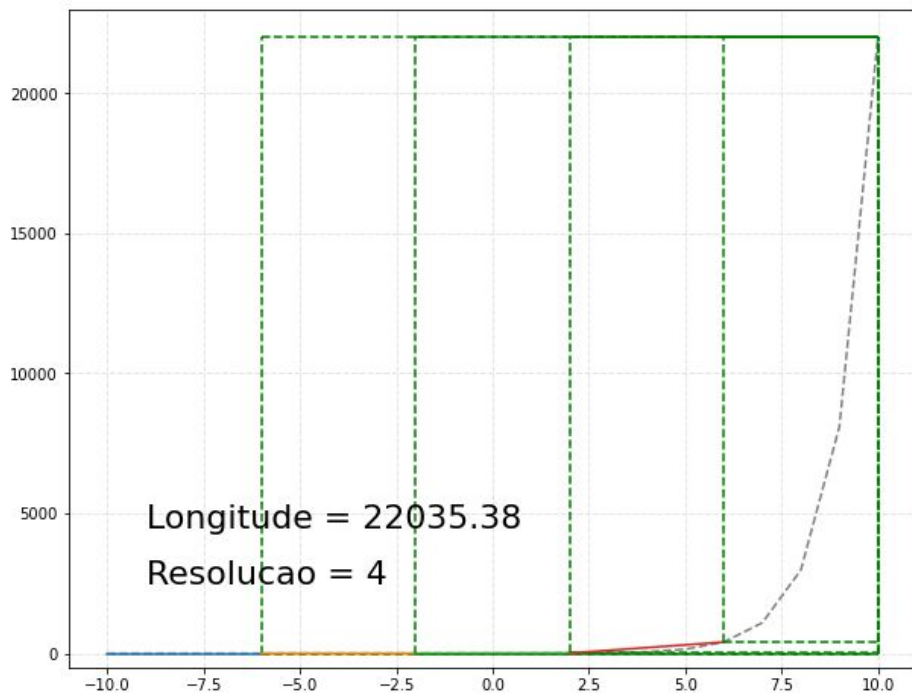
Resultados



Resultados

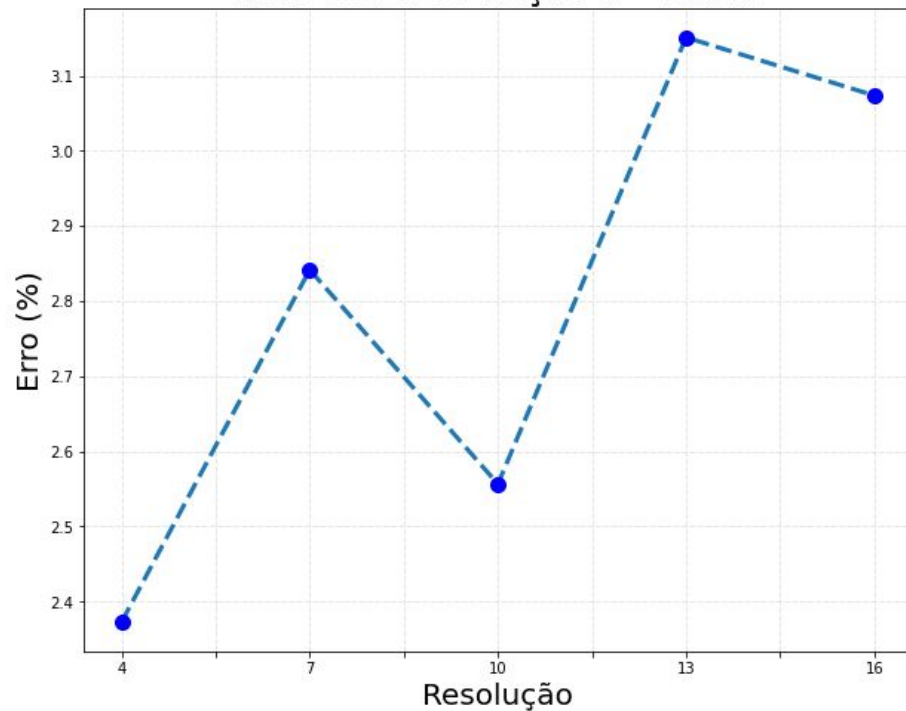


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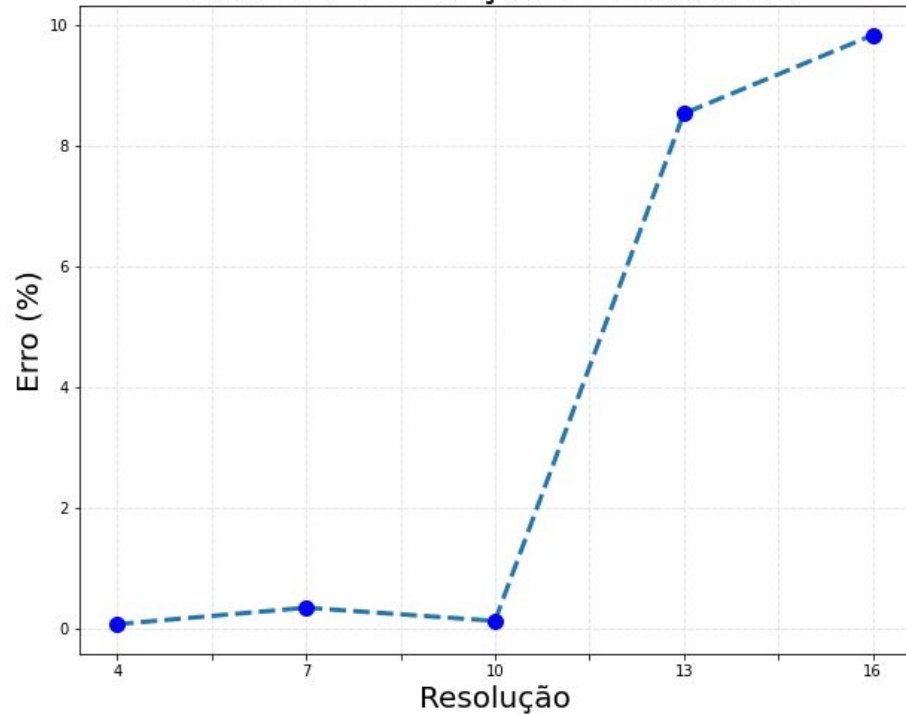


Taxa de Erros

Taxa de Erro Função 1 - Linear

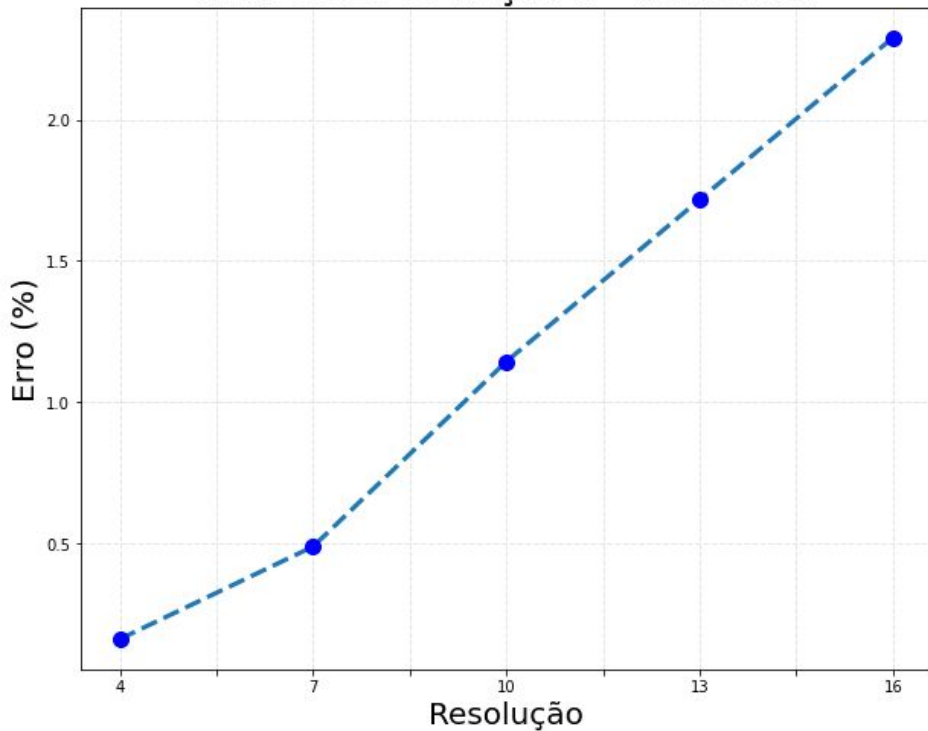


Taxa de Erro Função 2 - Cuadratica

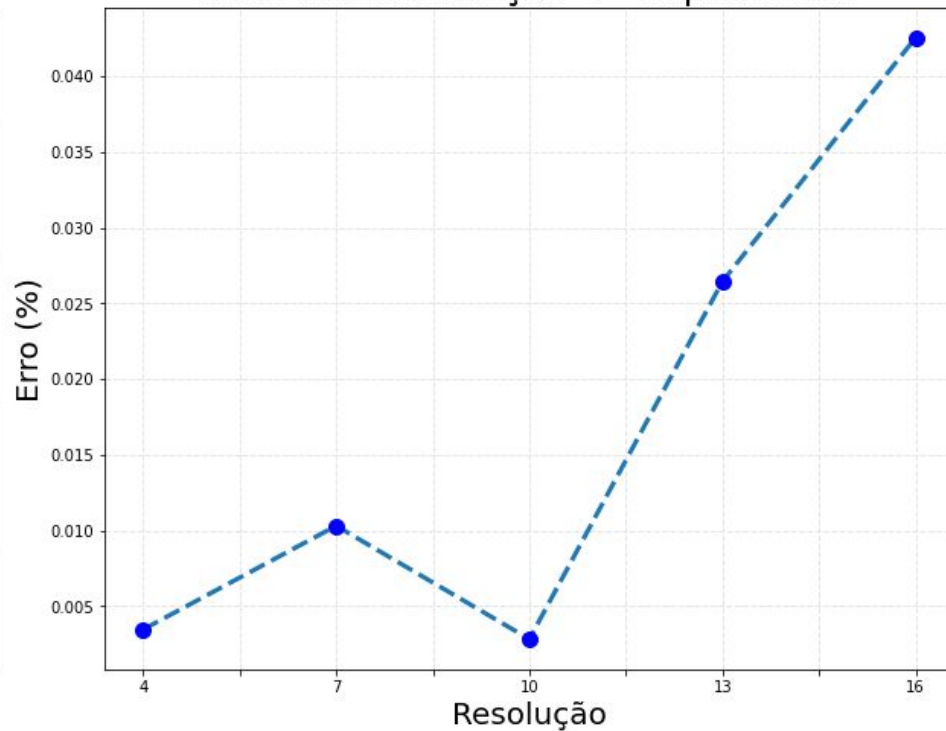


Taxa de Erros

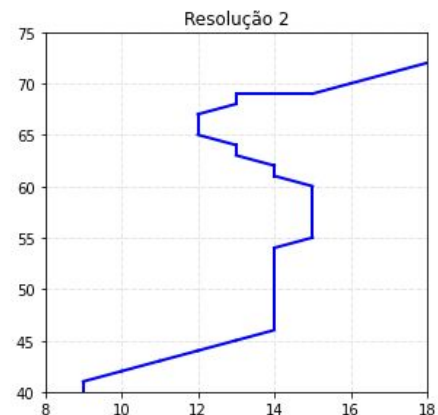
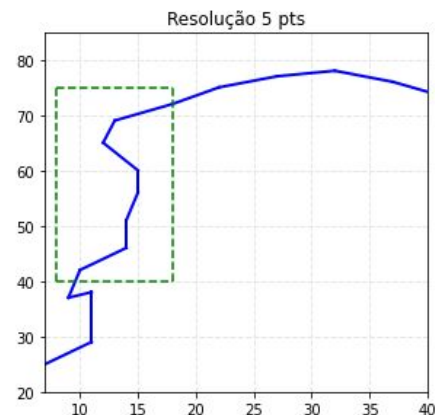
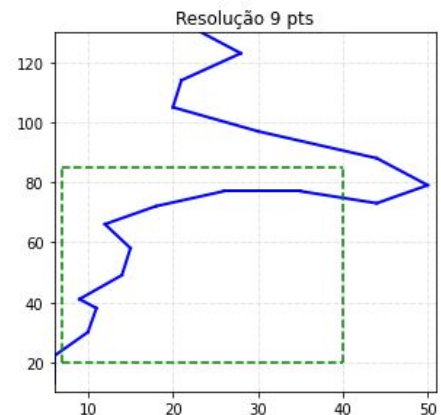
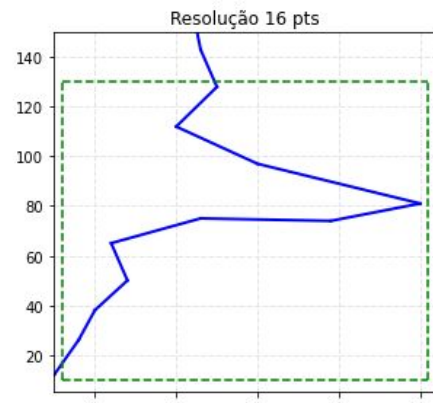
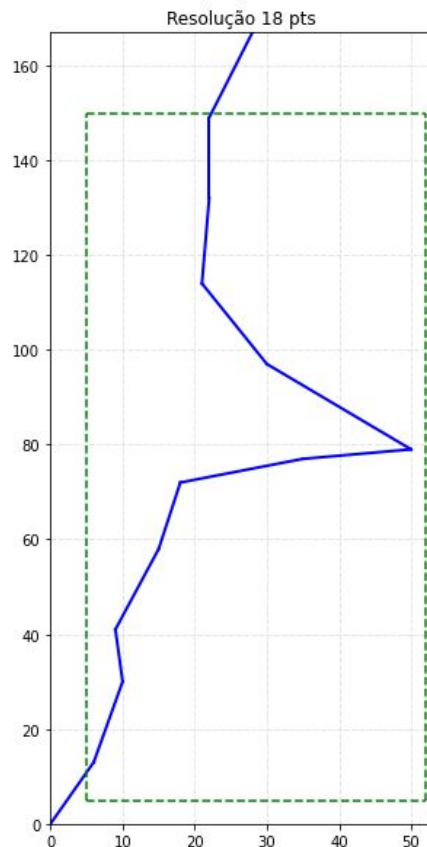
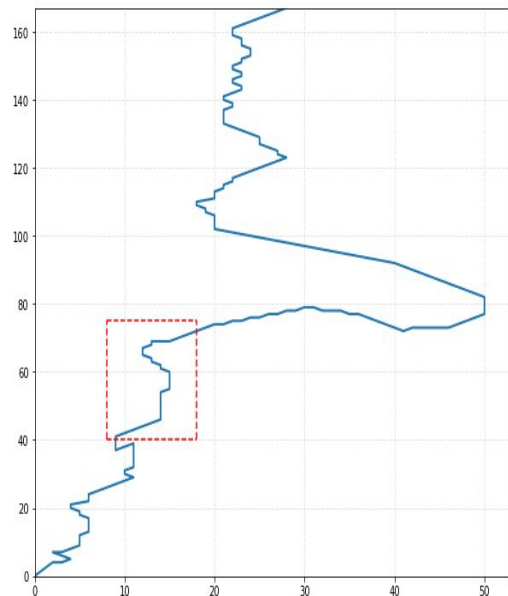
Taxa de Erro Função 3 - Sinusoidal



Taxa de Erro Função 4 - Exponencial



Generalização Cartográfica



Conclusões

- O Strip-Tree apresenta uma metodologia muito interessante, desde a digitalização da curva até como armazenar as informações dentro de uma Árvore Binária.
- Deve-se notar que, para uma determinada resolução definida, será obtida a aproximação da curva, que a sua vez será armazenada no Strip-Tree; Portanto, uma árvore do tipo Strip-Tree terá apenas uma resolução.
- Para o procedimento da digitalização, o mais apropriado seria implementar o uso do limite de percepção visual, e não simplesmente um número de pontos.

Muito Obrigado