



# **Irrigation Systems and Nutrient Management**

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Presentation will be available at: <http://ucanr.org/schwankl>

# Irrigation Management

- Irrigation water management, and nutrient management, are directly tied to the irrigation system being used.



# Irrigation Systems

- Source of nutrients through fertigation.



# Irrigation Systems

- Source of nutrients through fertigation.
- Source of water which can leach nutrients from the root zone.



# Irrigation Systems

- Source of nutrients through chemigation.
- Source of water which can leach nutrients from the root zone.
  - Rainfall



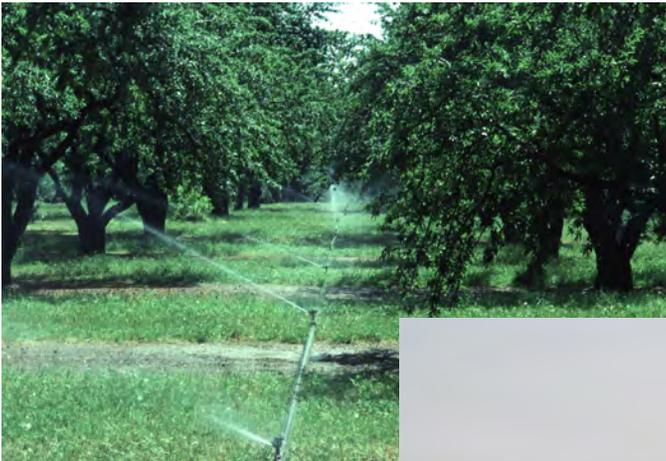
# Irrigation Systems

- Types of irrigation systems:
  - Surface irrigation – furrow and border strip



# Irrigation Systems

- Types of irrigation systems:
  - Surface irrigation – furrow and border strip.
  - Sprinkler irrigation



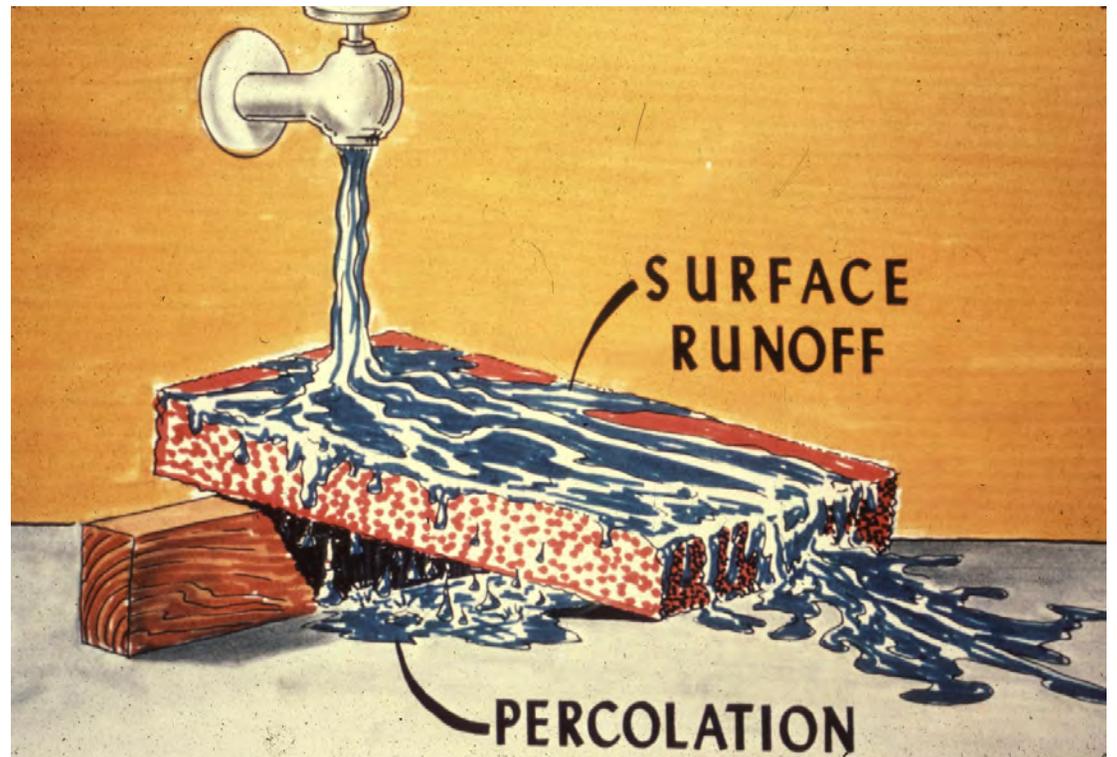
# Irrigation Systems

- Types of irrigation systems:
  - Surface irrigation – furrow and border strip.
  - Sprinkler irrigation
  - Microirrigation



# Irrigation Efficiency

- Measure of how much of the applied water goes to “beneficial uses”.
- The major beneficial use is to supply plant water needs (ET)



# Surface Irrigation

- Water losses can be from deep percolation and tailwater runoff.



# Surface Irrigation

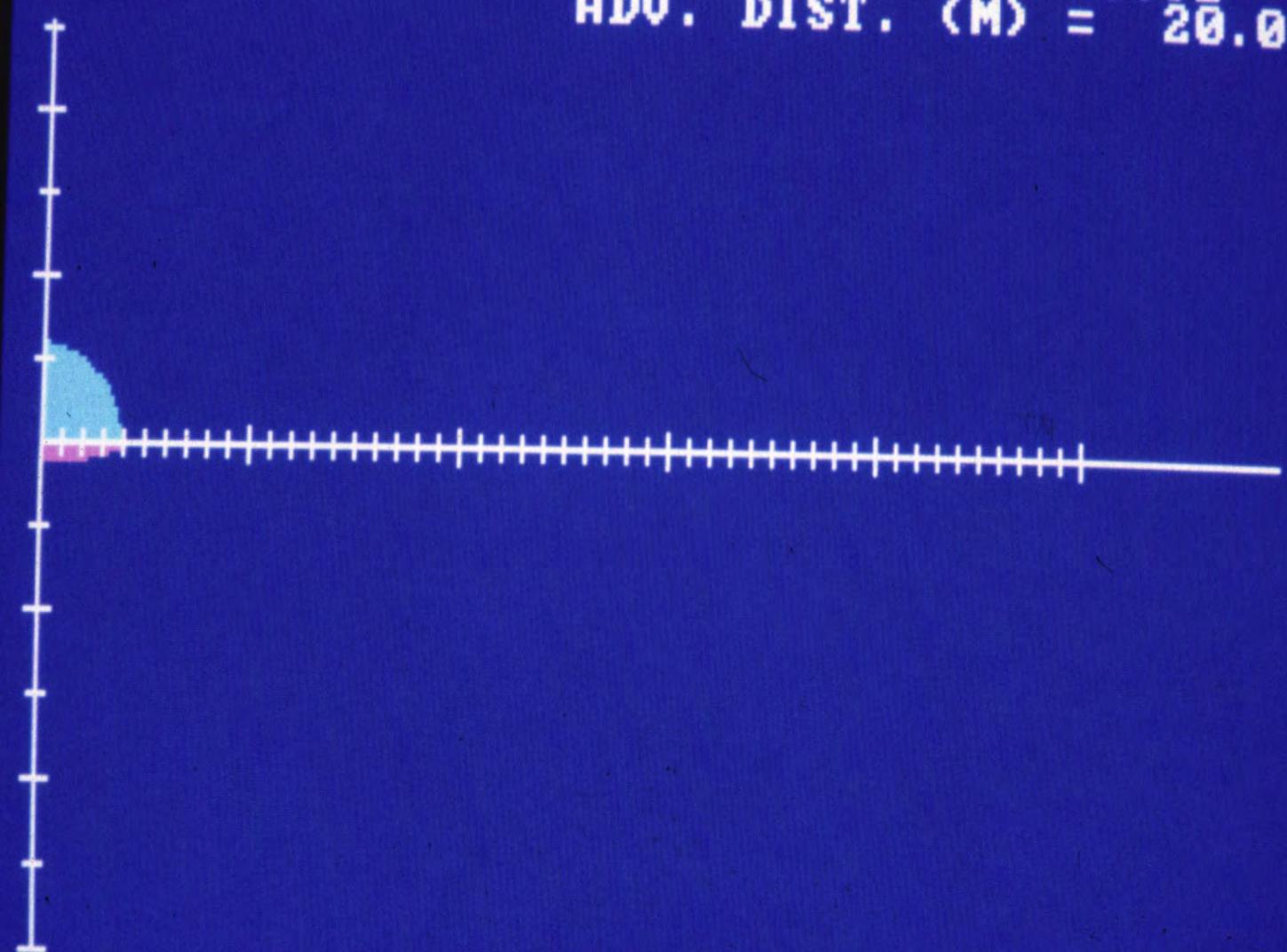
- Losses can be from deep percolation and tailwater runoff.
  - Minimize runoff losses by Tailwater Return Systems.



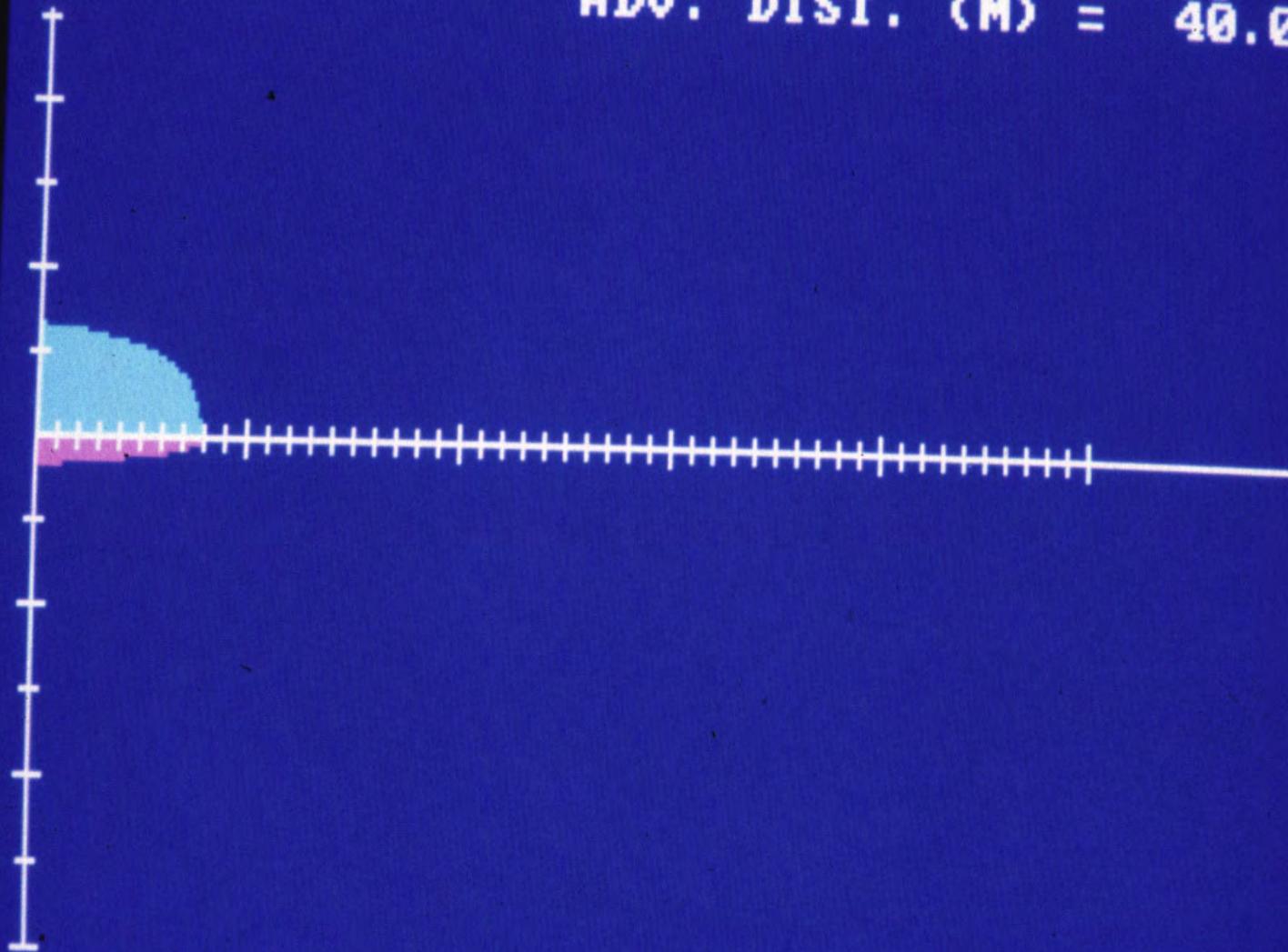
# Surface Irrigation

- Losses can be from deep percolation and tailwater runoff.
  - Minimize runoff losses by Tailwater Return Systems.
  - Deep percolation losses are a challenge for surface irrigation systems.

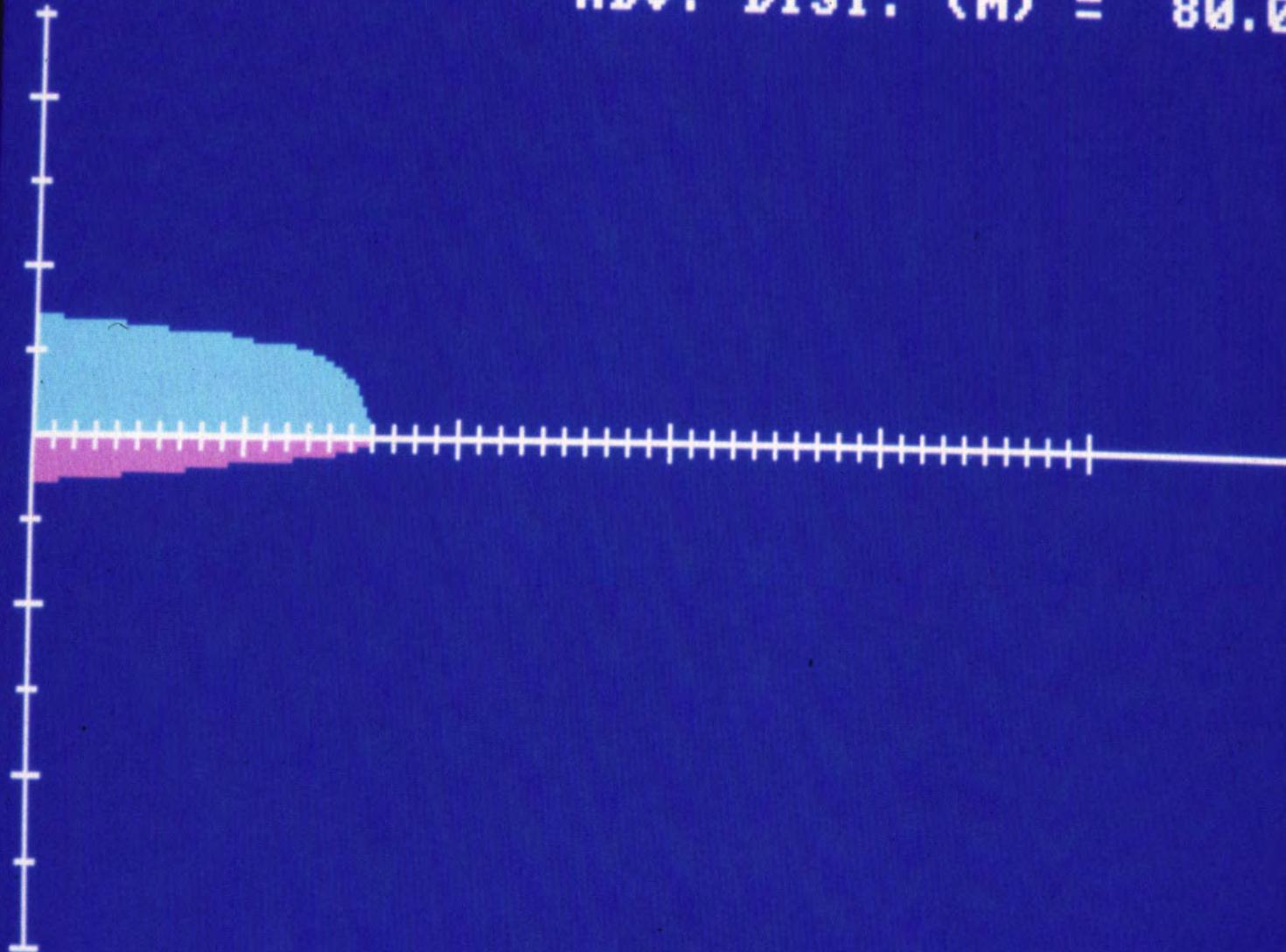
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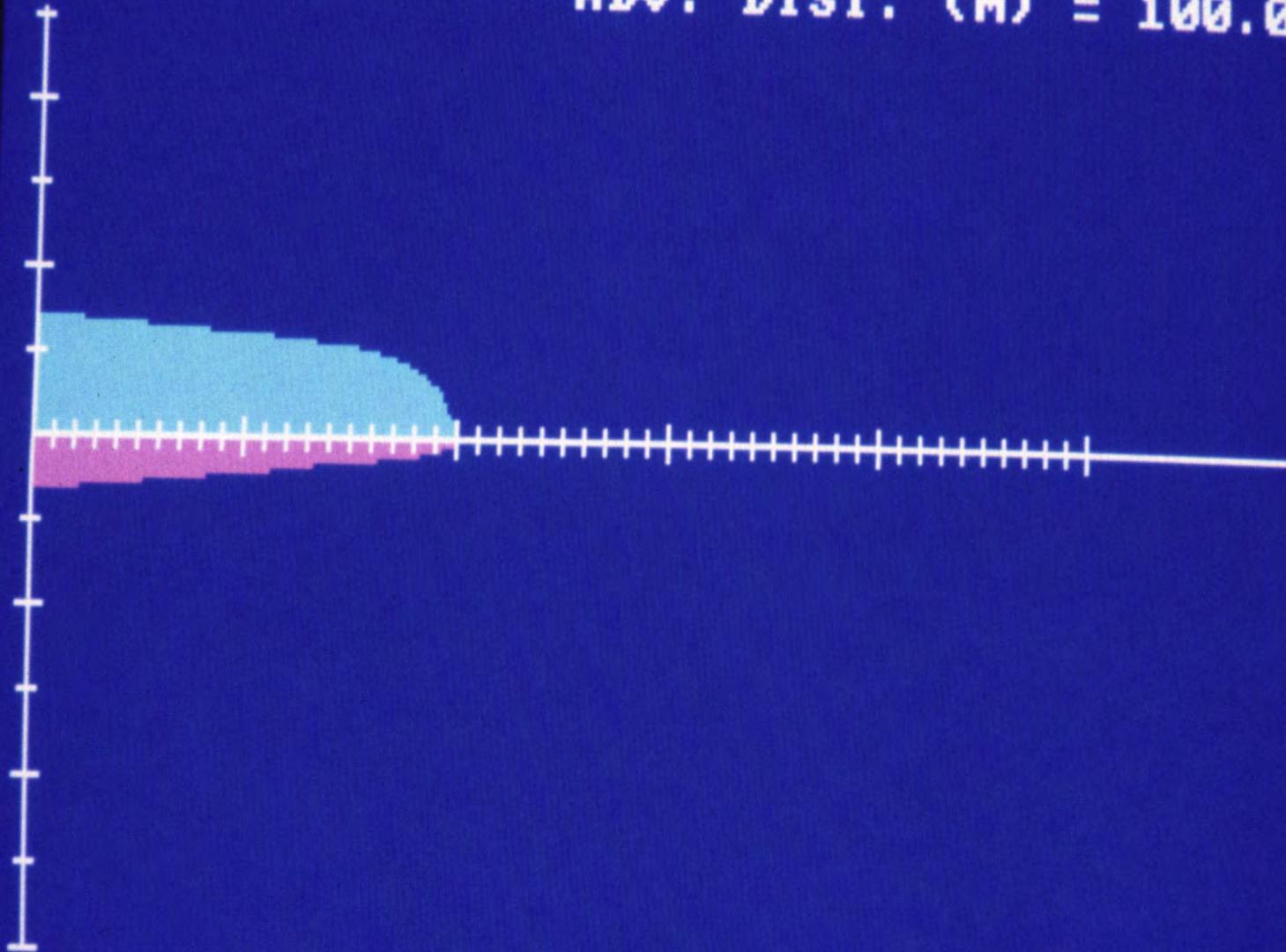
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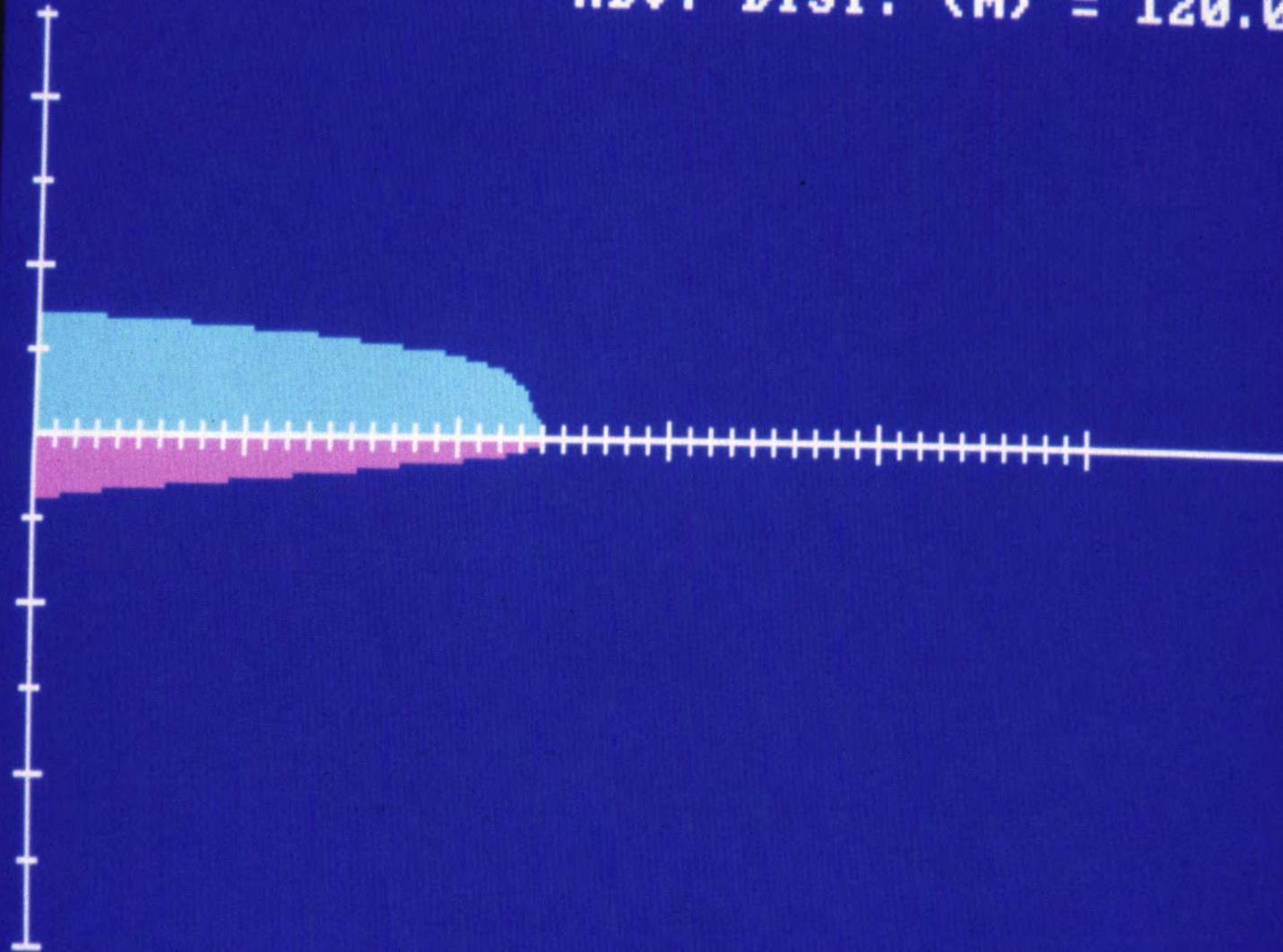
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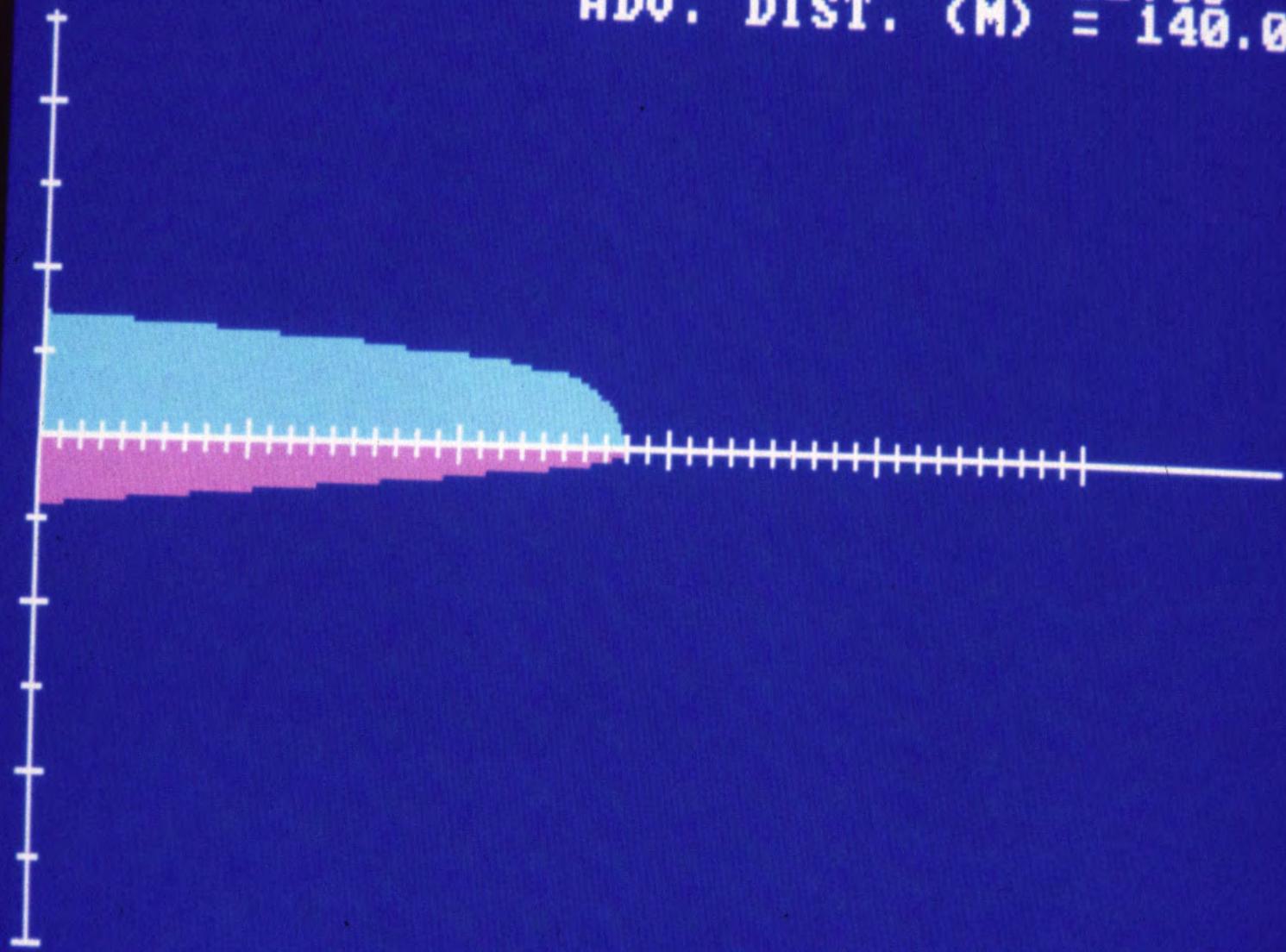
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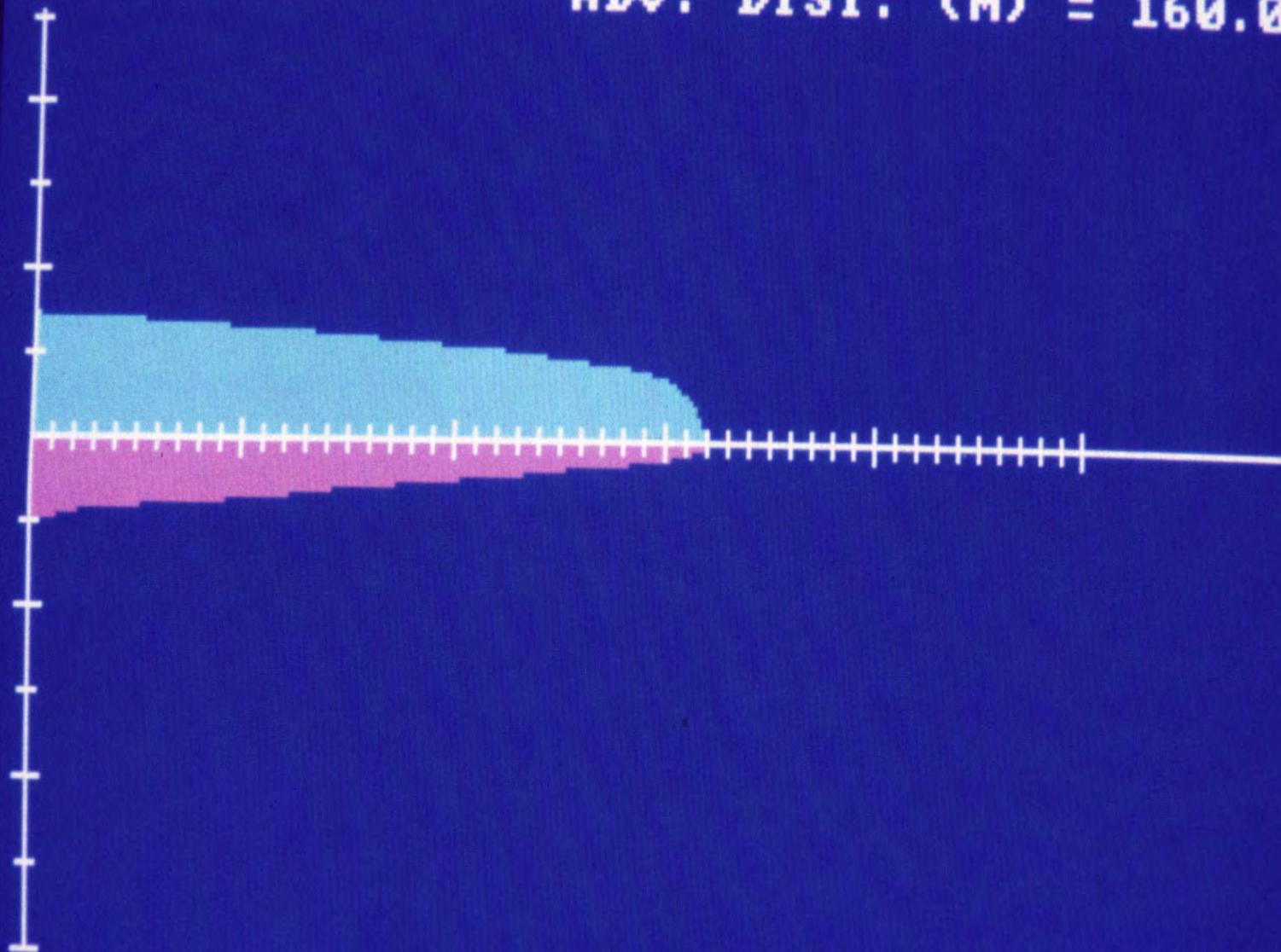
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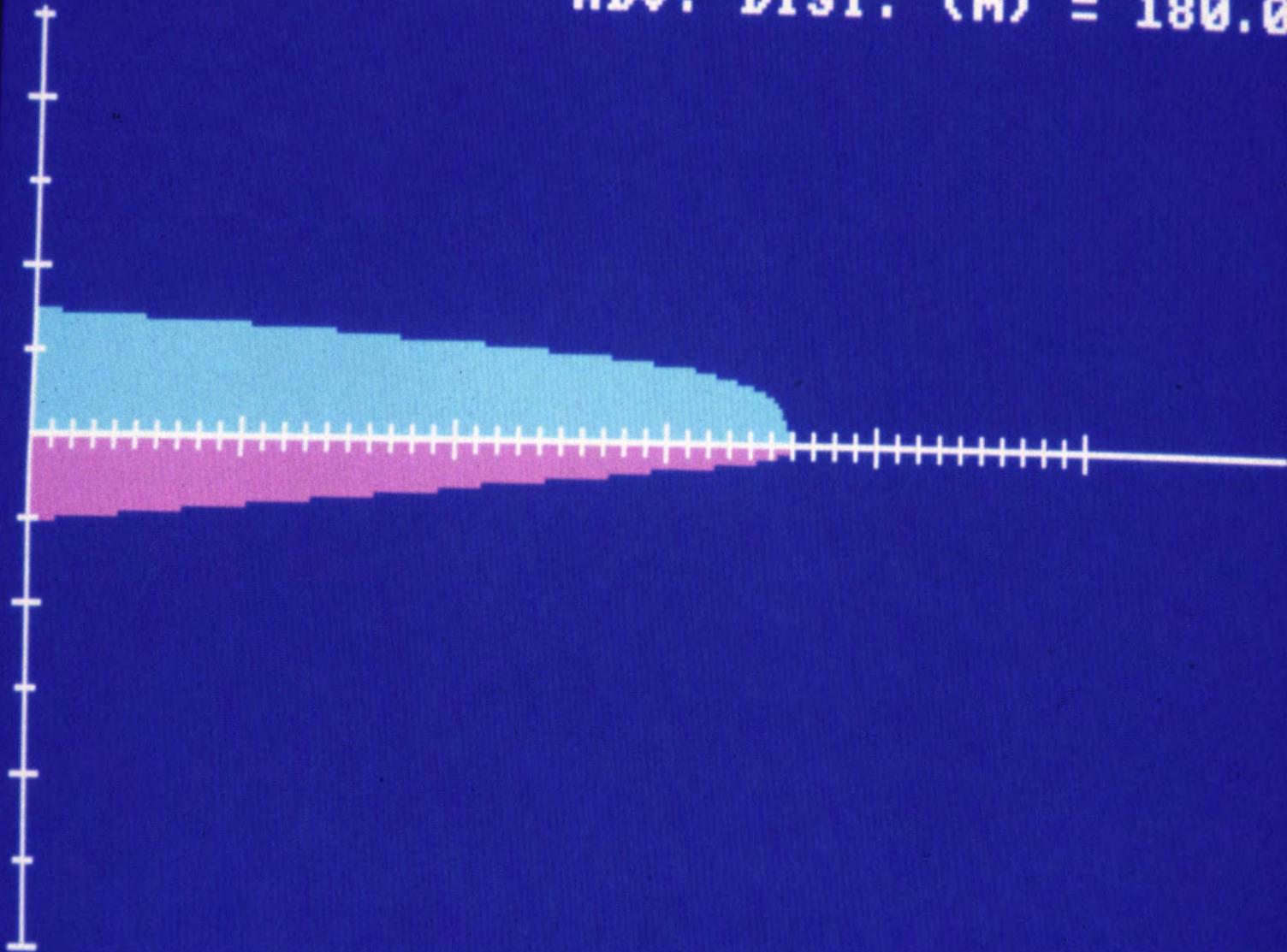
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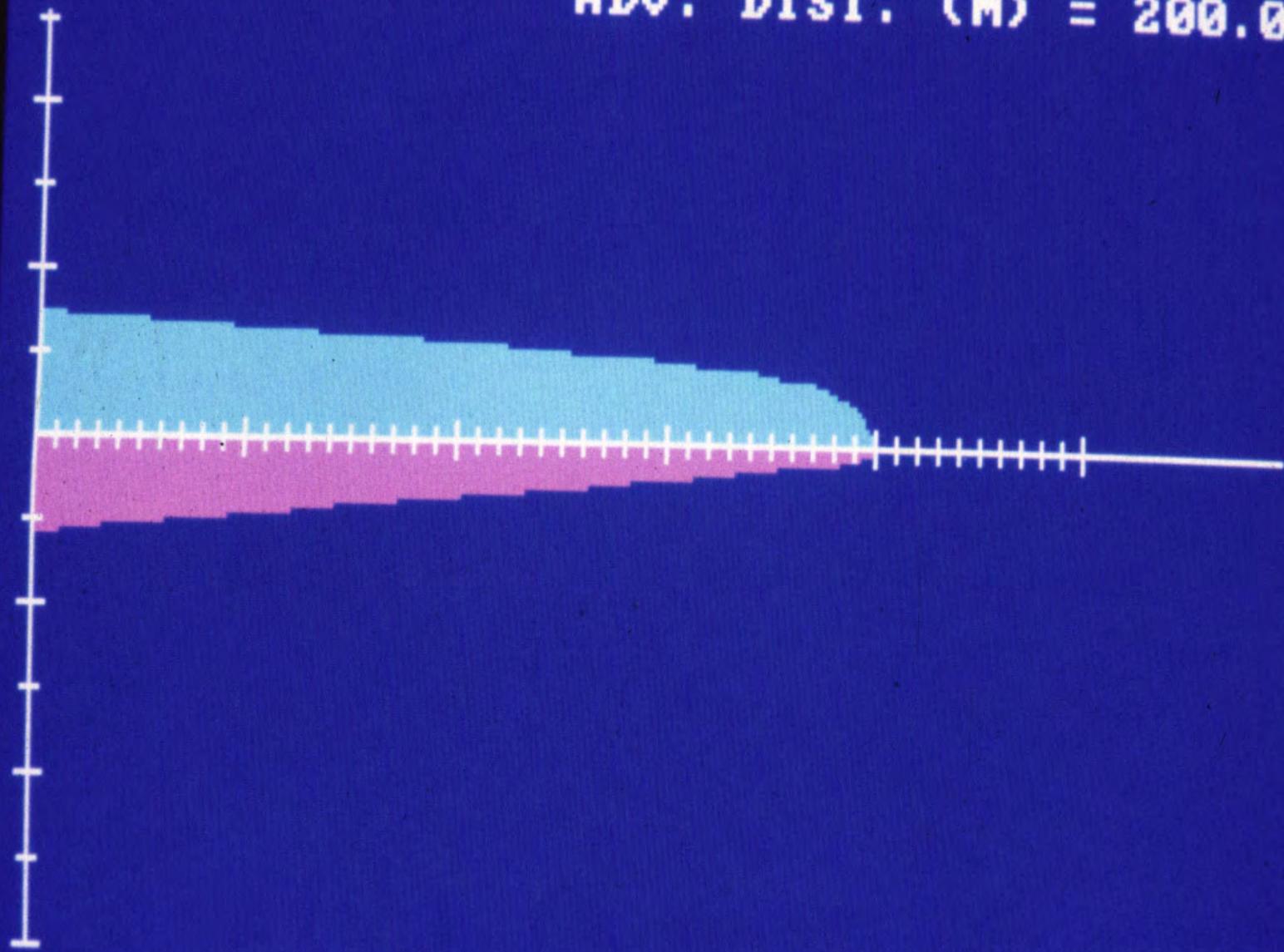
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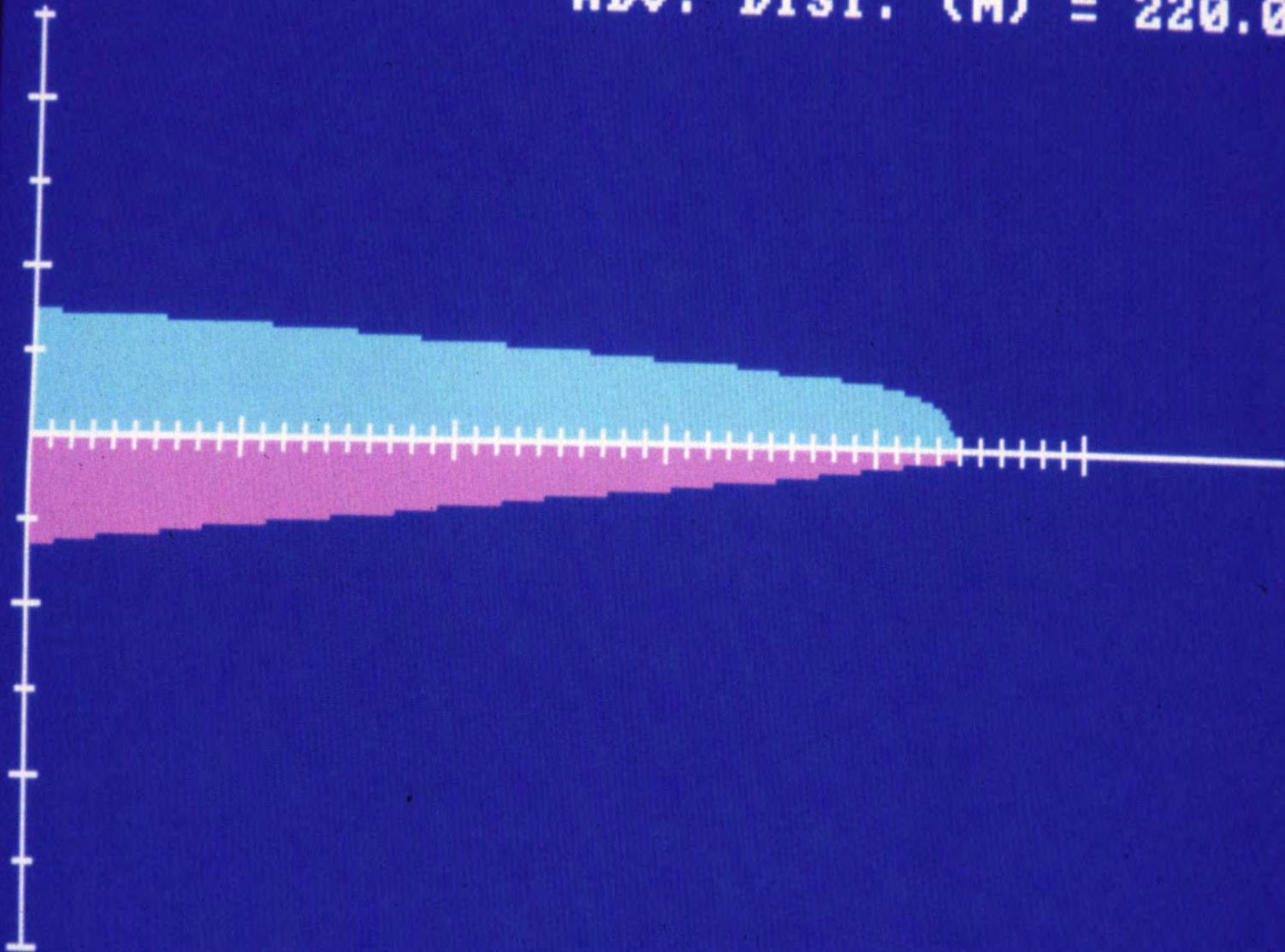
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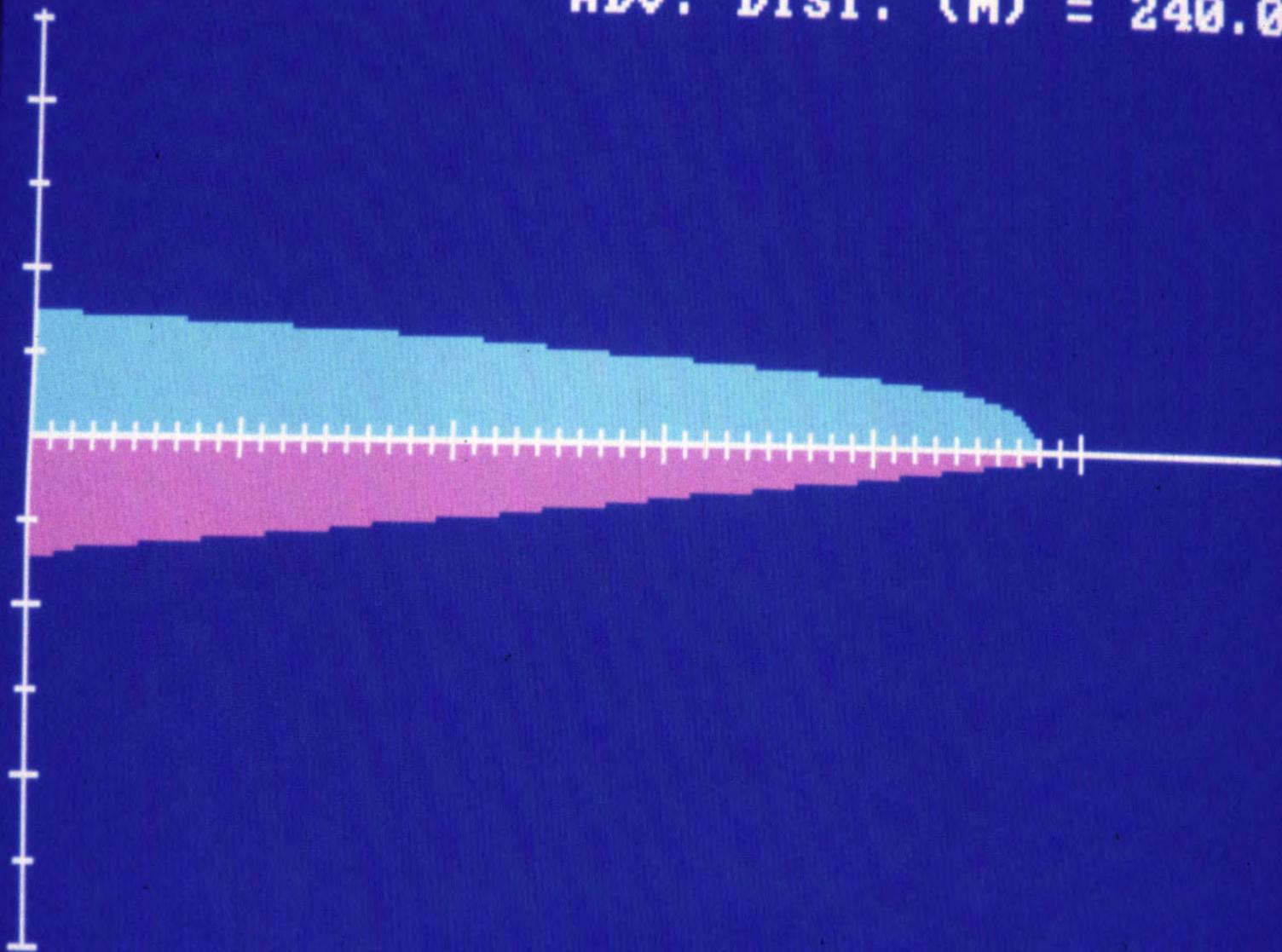
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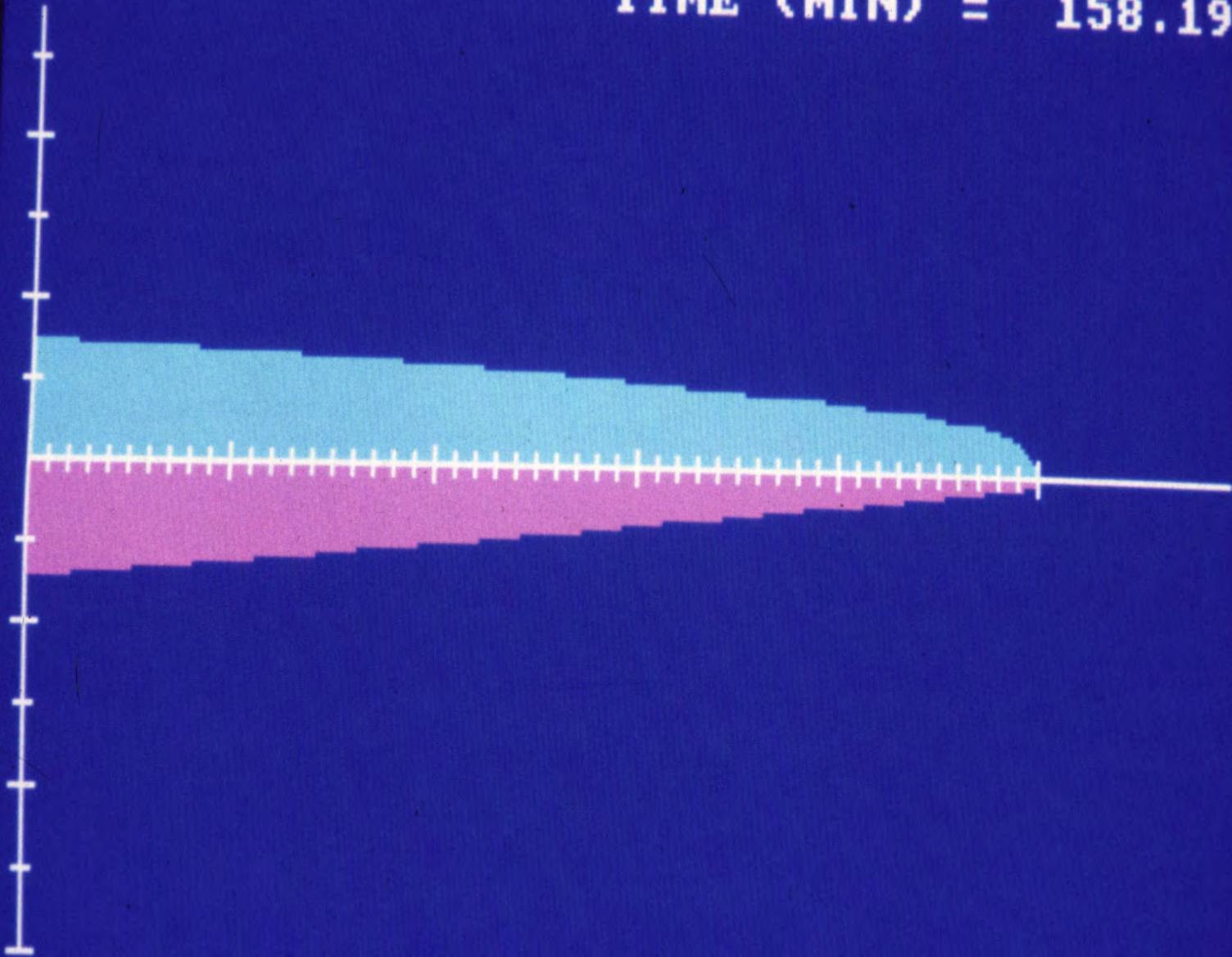
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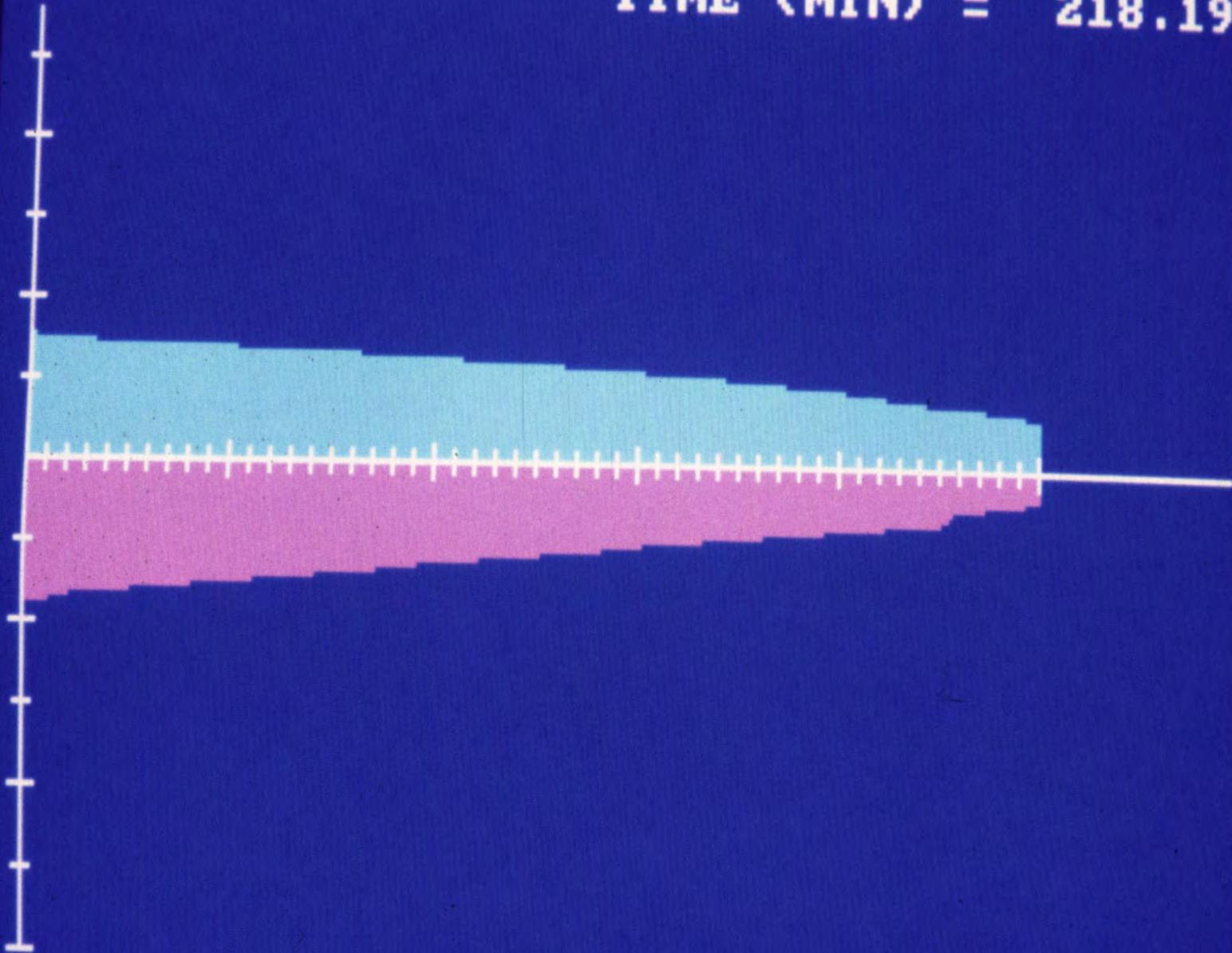
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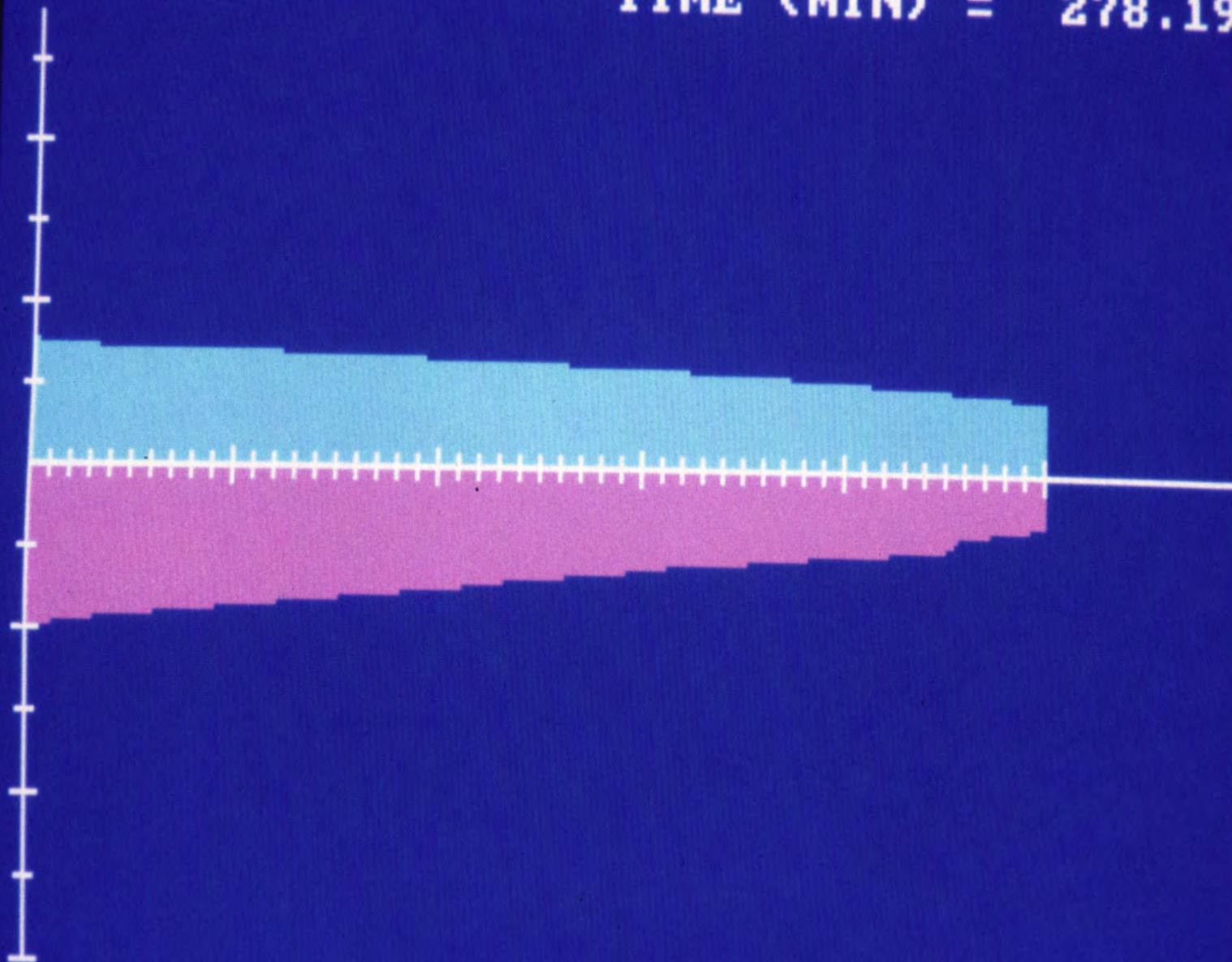
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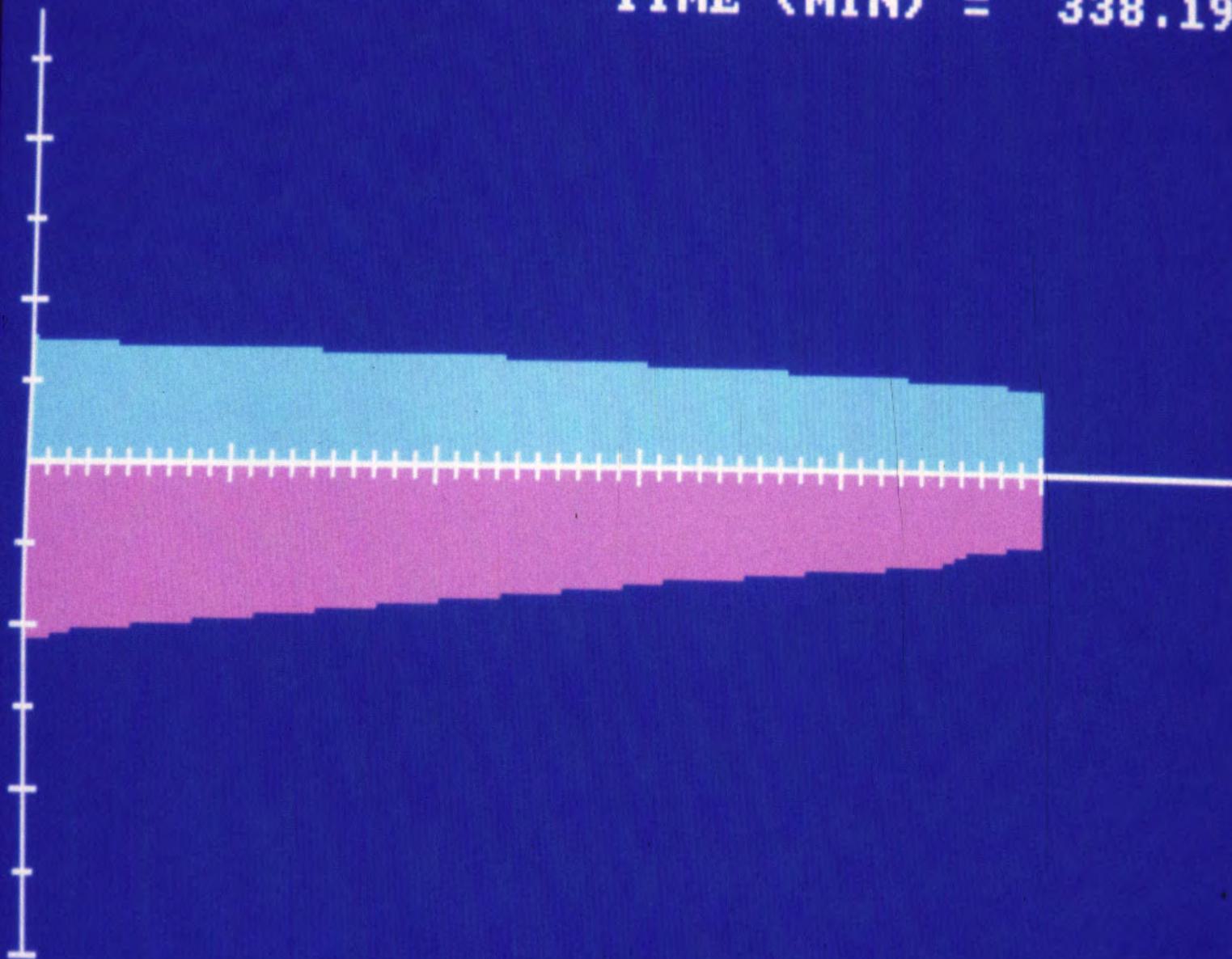
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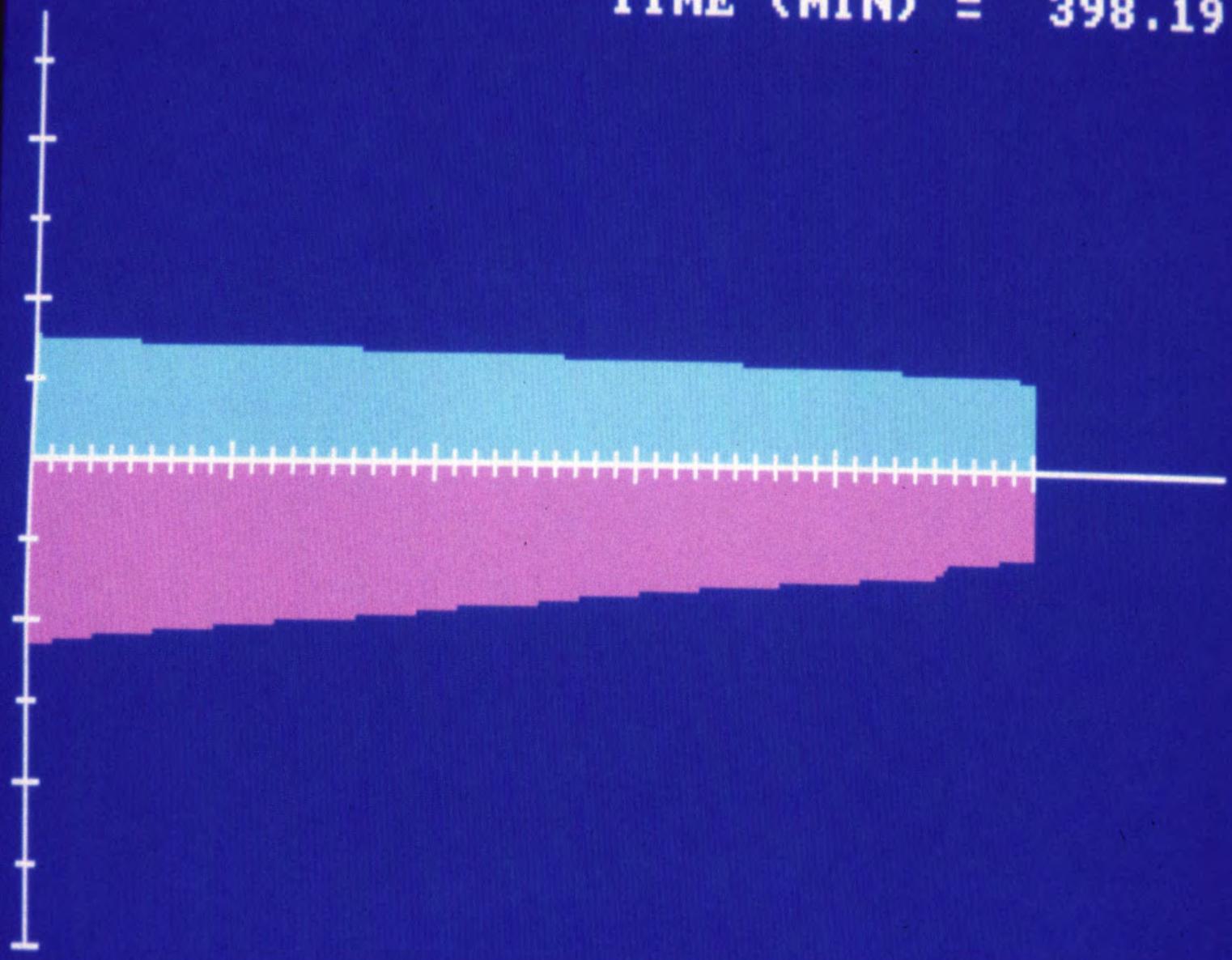
STORAGE PHASE  
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STORAGE PHASE  
TIME (MIN) = 338.19

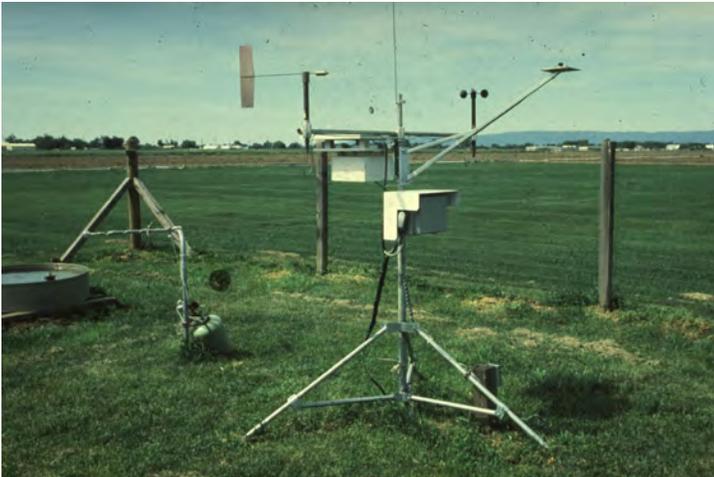


STORAGE PHASE  
TIME (MIN) = 398.19



# Surface Irrigation

- Losses can be from deep percolation and tailwater runoff.
  - Minimize runoff losses by Tailwater Return Systems.
  - Deep percolation losses can be reduced by;
    - Irrigating the right amount at the right time (irrigation scheduling)



# Surface Irrigation

- Losses can be from deep percolation and tailwater runoff.
  - Minimize runoff losses by Tailwater Return Systems.
  - Deep percolation losses can be reduced by;
    - Irrigating the right amount at the right time (irrigation scheduling)
    - Having a well designed system (right length field, right flow rate, etc.)

# What can you do to minimize deep percolation losses?

- Increase the flow per foot of border check.  
Case study: Usually run 2 valves per check. Make checks half as wide and run 1 valve at a time. More flow per foot of check width.

	<u>Wide check (200')</u>	<u>Narrow check (100')</u>
<b>Irrigation Applied</b>	<b>5.1"</b>	<b>4.3"</b>



# What can you do to minimize deep percolation losses?

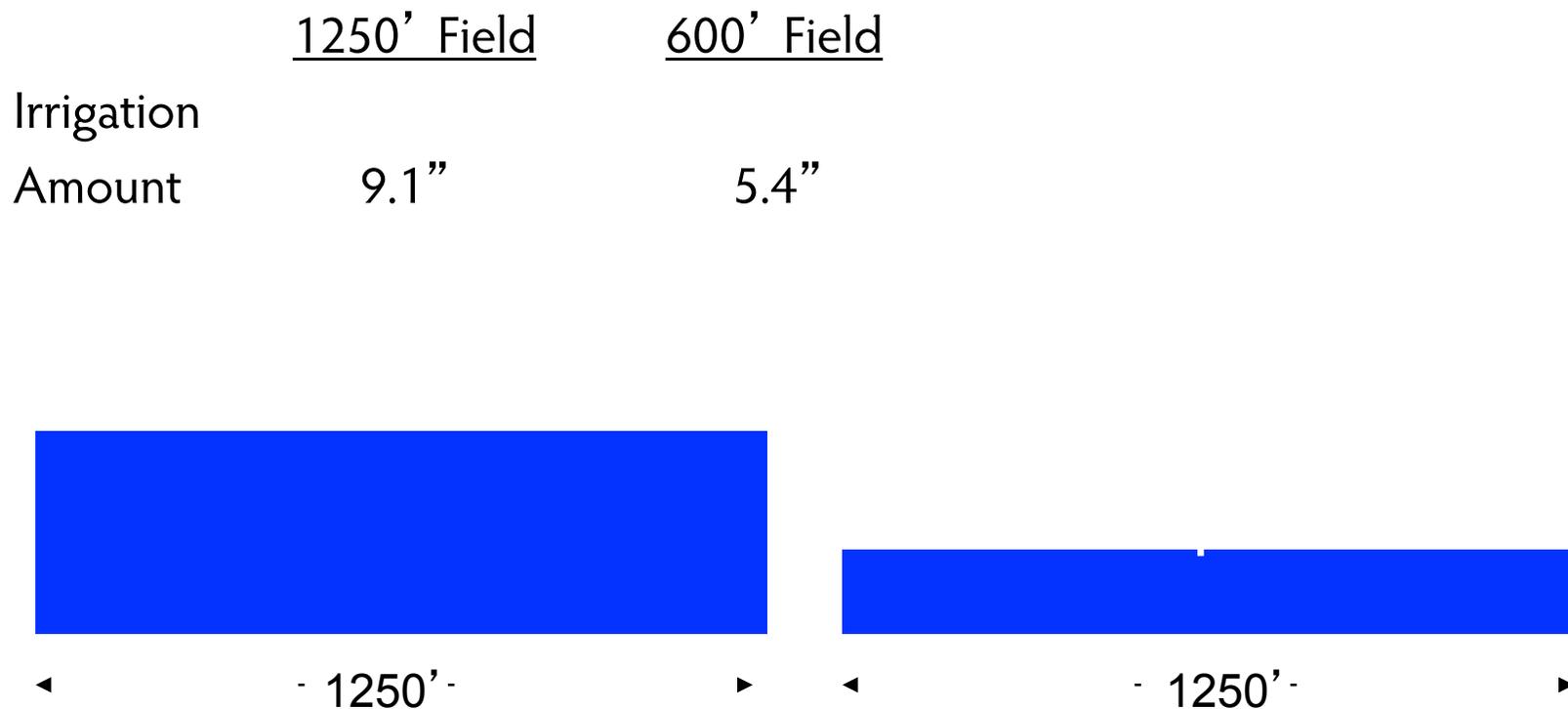
- Increase the flow per foot of border check.
- Increase the field slope.

	<u>0.001 slope</u>	<u>0.002 slope</u>
Irrigation Applied	5.1"	4.8"



# What can you do to minimize deep percolation losses?

- Increase the flow per foot of border check.
- Increase the field slope.
- Reduce field length.



# Surface Irrigation

- Losses can be from deep percolation and tailwater runoff.
- Good management needed when adding nutrients to irrigation water.
  - Know how much water and nutrient is being applied!



# Sprinkler Irrigation

- Should be minimal runoff losses if designed correctly.



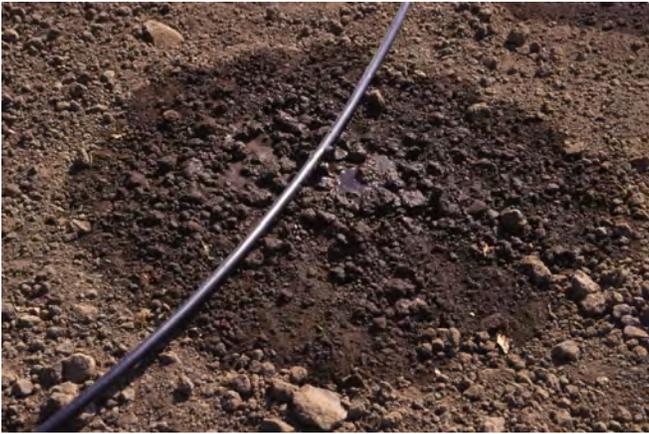
# Sprinkler Irrigation

- Should be minimal runoff losses if designed correctly.
- Deep percolation losses can be minimized by good irrigation scheduling. Hardware gives better control.



# Microirrigation Irrigation

- Minimal runoff.



# Microirrigation Irrigation

- Minimal runoff.
- Deep percolation losses can be minimized with good irrigation scheduling. Again, hardware provides better control.



# Irrigation - Summary

- If there is deep percolation associated with the irrigation, it can transport nutrients below the root zone.

# Irrigation

- If there is deep percolation associated with the irrigation, it can transport nutrients to below the root zone.
- With fertigation, nutrients are applied with the irrigation water. Special care needs to be taken to make sure the nutrients stay in the root zone. Know how much water and nutrient is being applied.
  - Care during fertigation event but also in subsequent irrigations so don't leach out nutrients.

# Questions?

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