



# Collective Problem Solving

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Master 1 Informatique

Université Paul Sabatier



# Natural Systems





# Natural Systems







# Natural System



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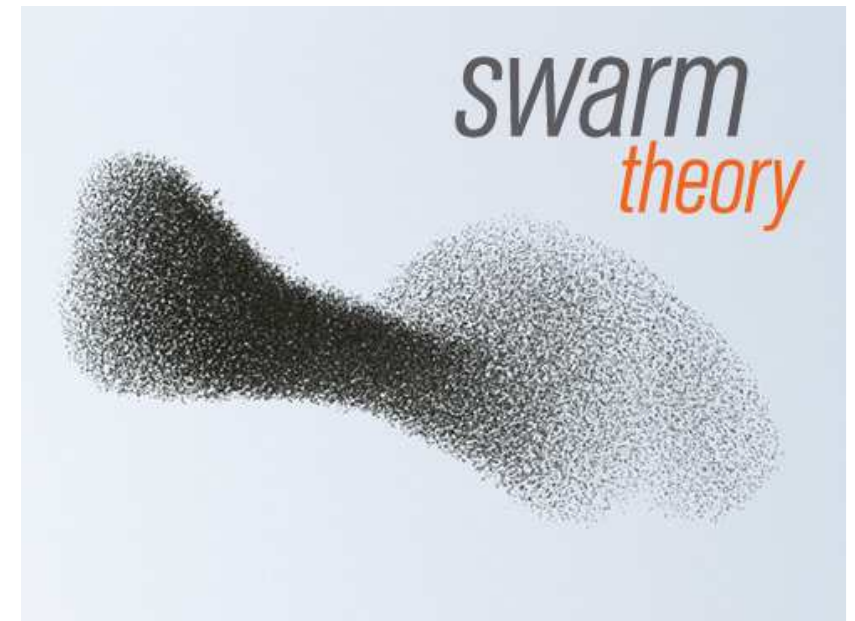
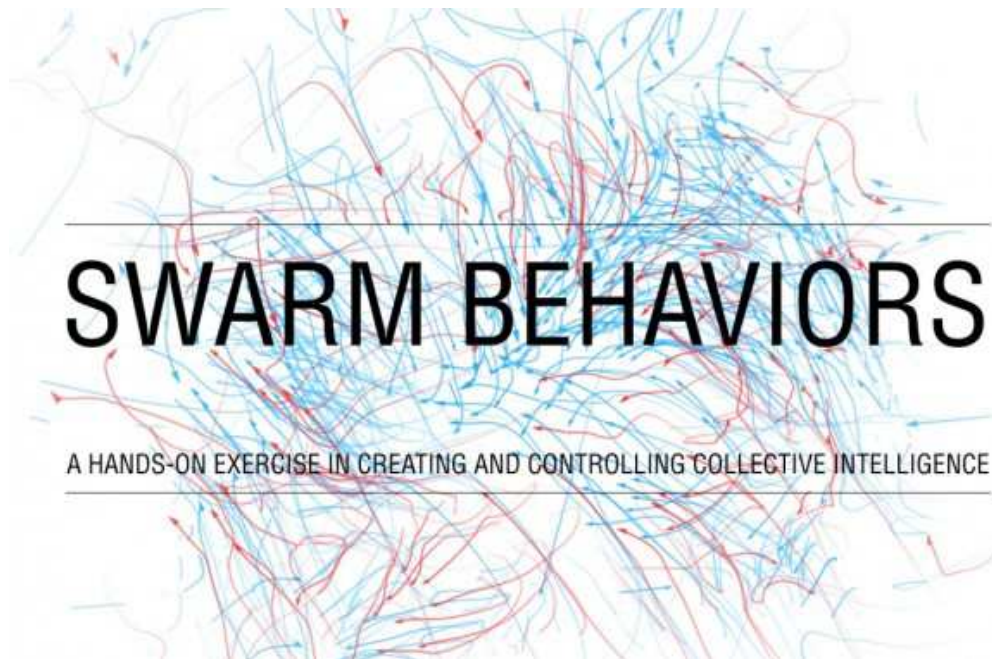




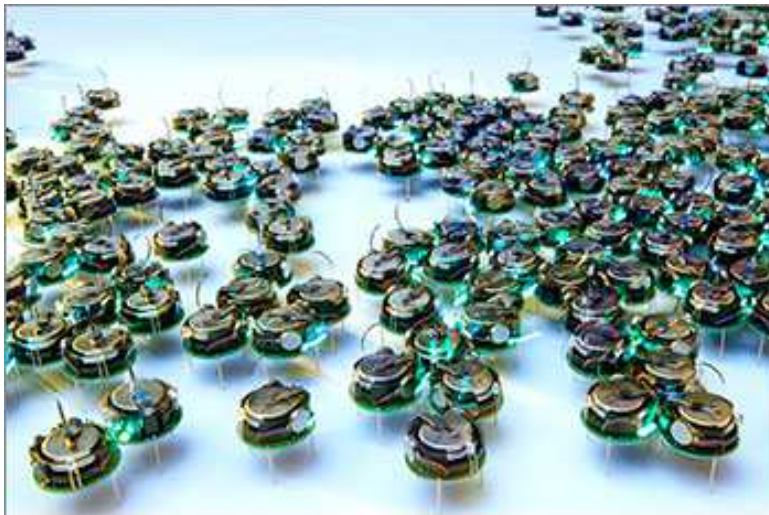
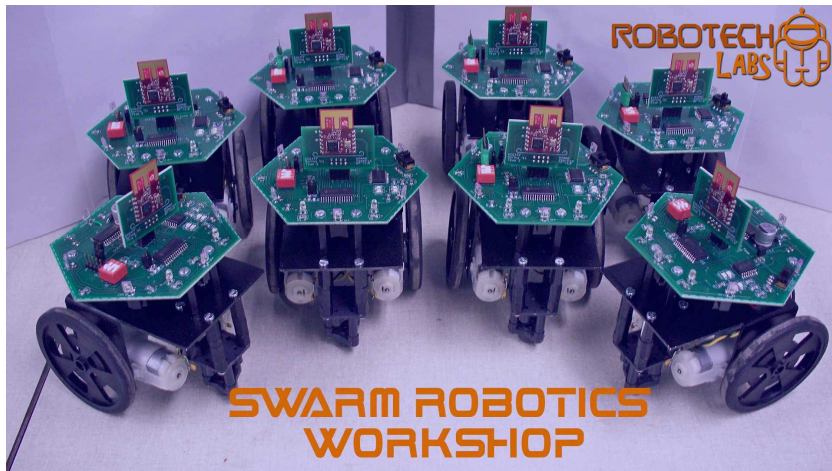


# Artificial System

- ✓ Flocking behavior
- ✓ Recreate complex (looking) flocking behaviors with three simple rules
  - » If I am *too far away from my neighbors*, move towards them
  - » If I am *too close to my neighbors*, move away from them
  - » If I am neither too close or too far from my neighbors, move with them



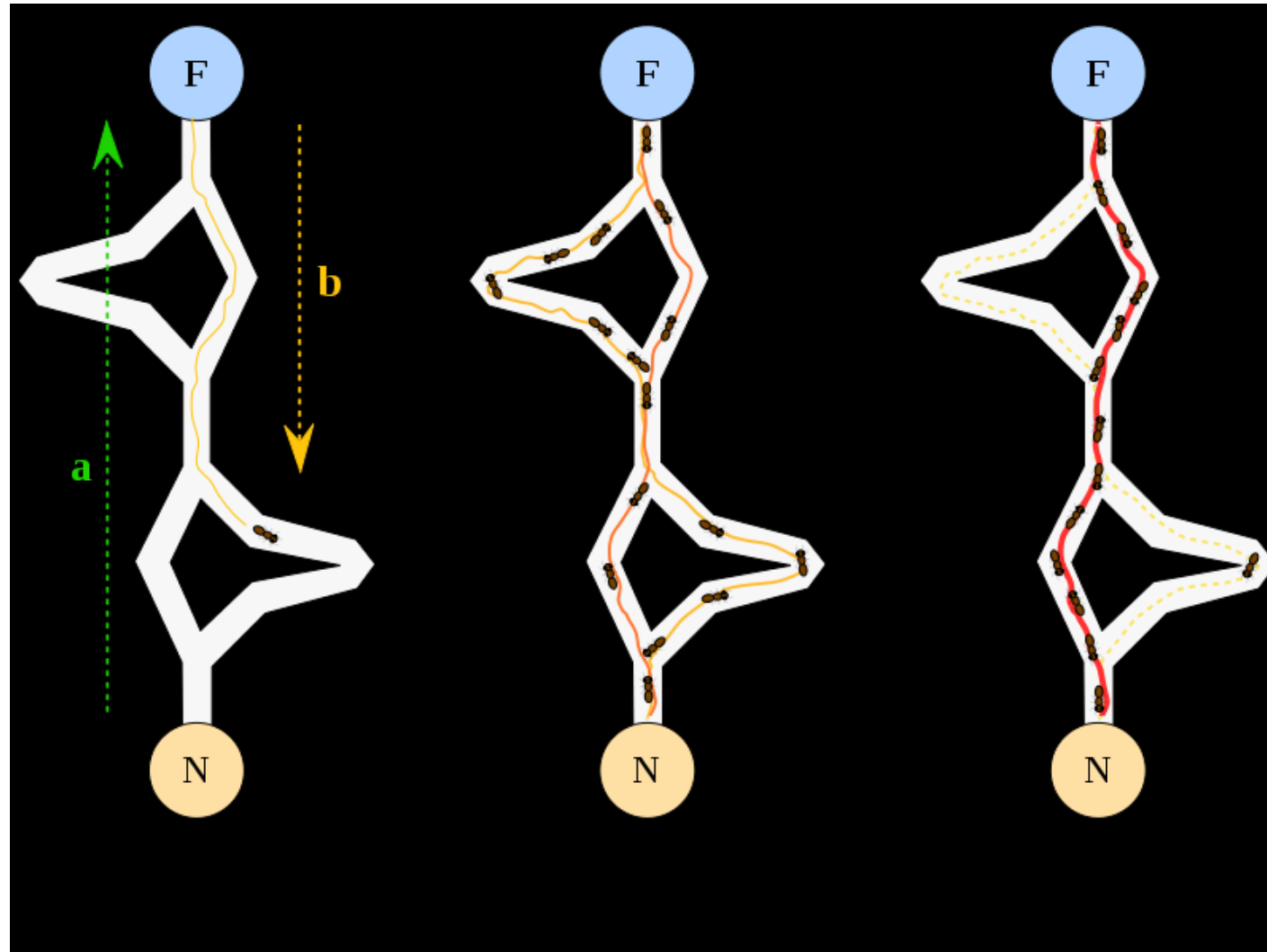
# Swarm Robotics



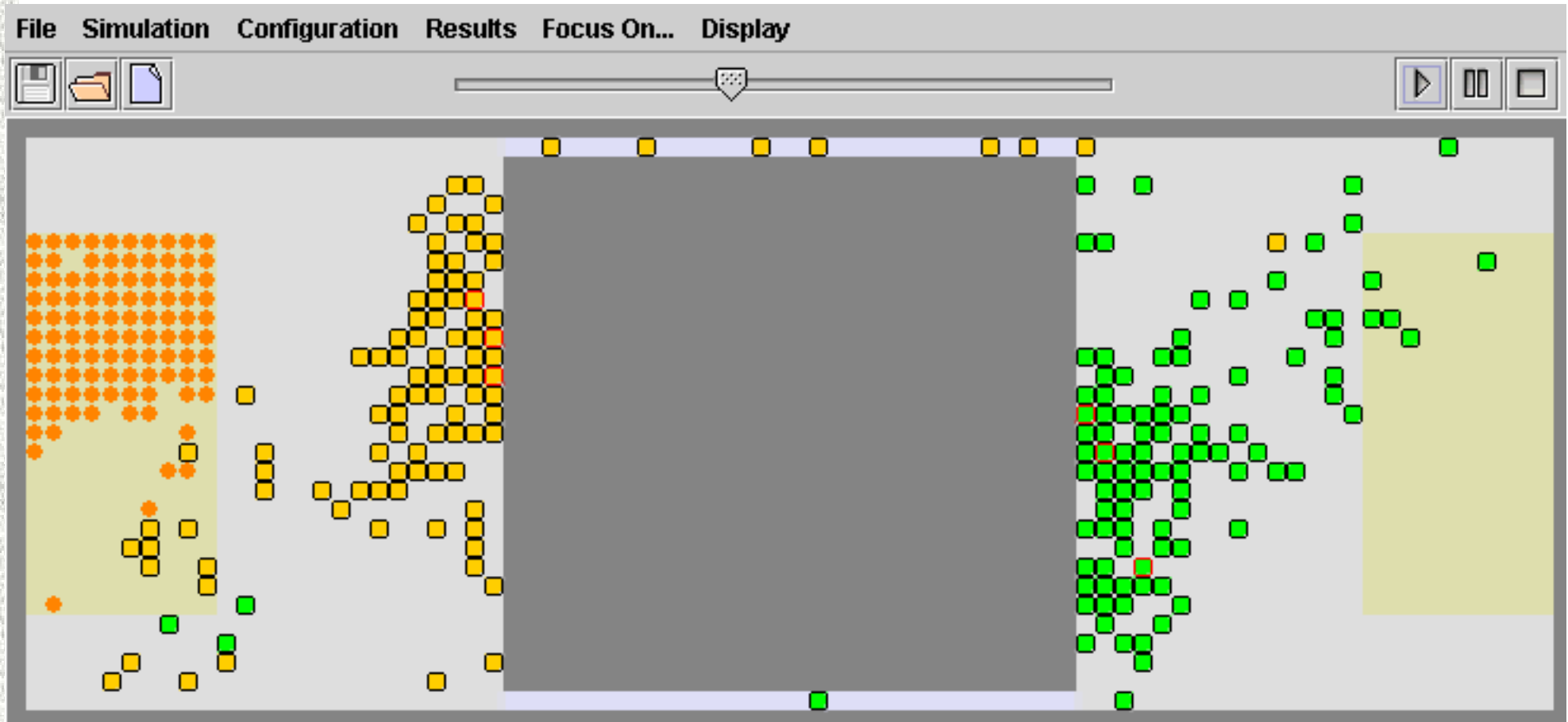




# Stigmergy



# Artificial System



Asia Recorder - Recording

View Effects Tools Help

Statistics:

Frames: 0

Rate: 0.00 frames/sec

Time: 00:00

Resolution: 1280 x 1024 (100%)

Properties:

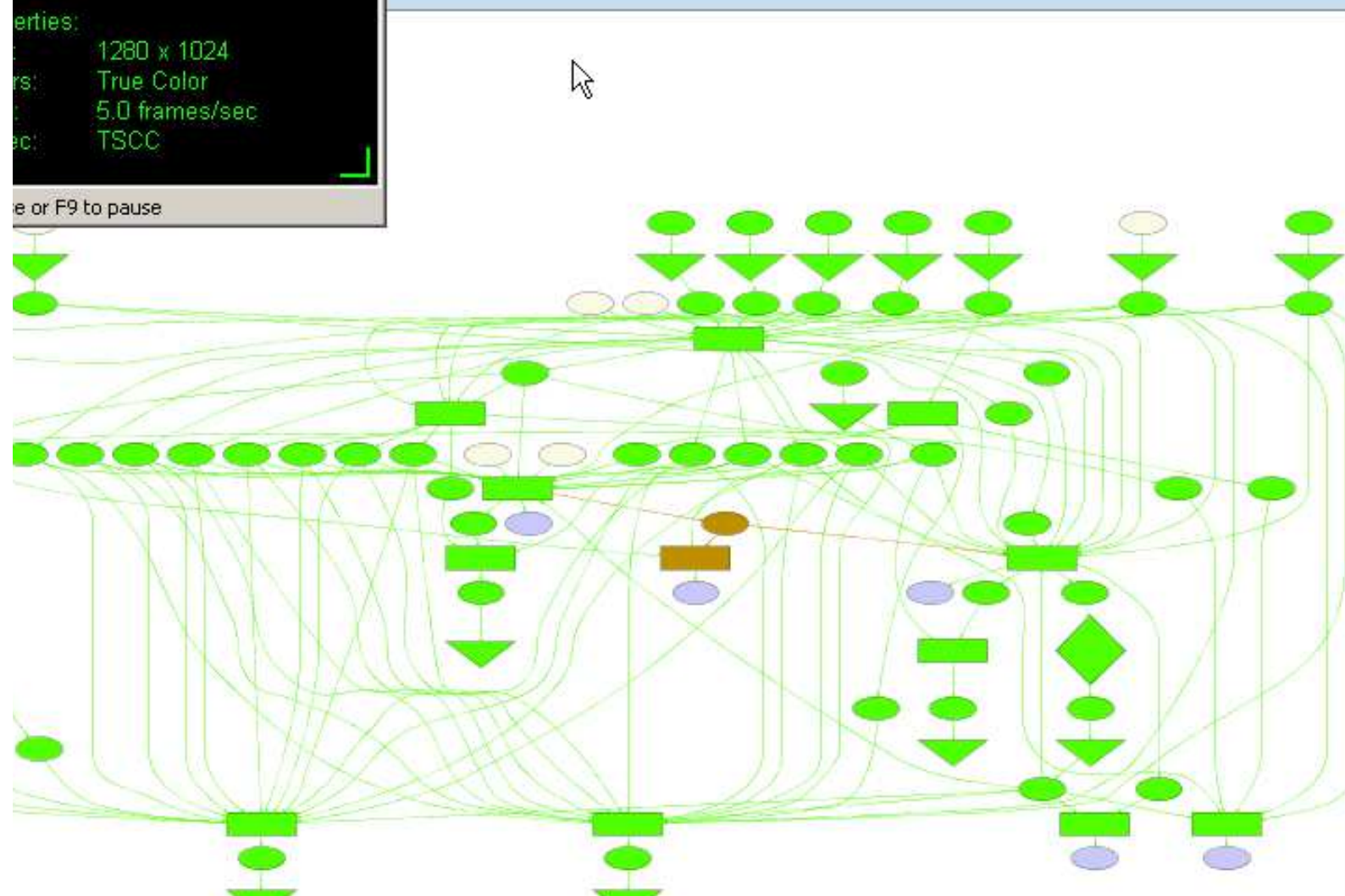
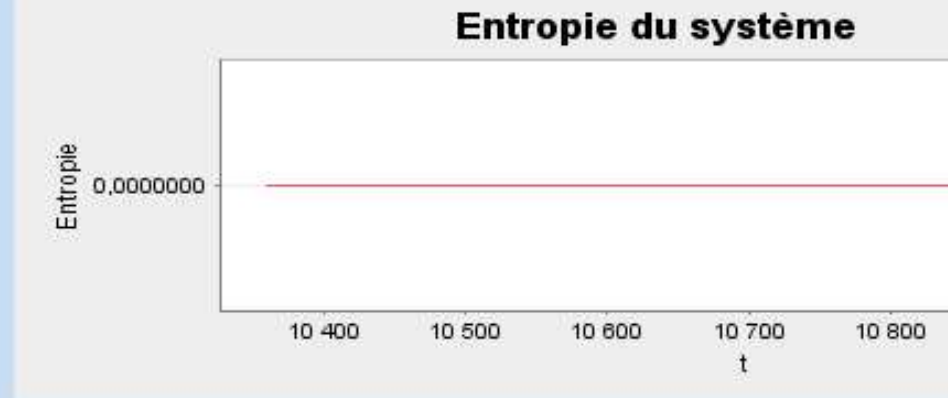
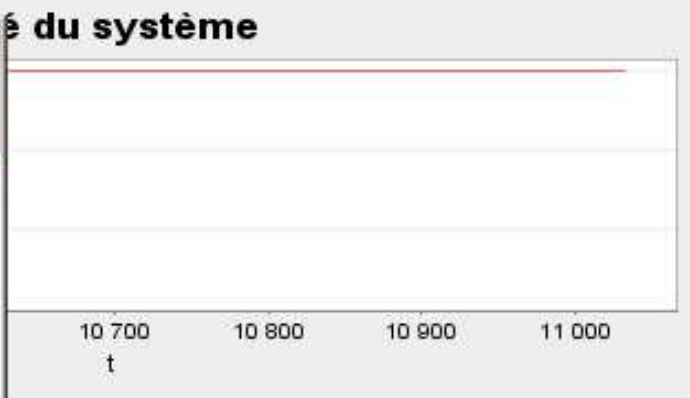
Resolution: 1280 x 1024

Colors: True Color

Frame Rate: 5.0 frames/sec

Codec: TSCC

Press F9 to pause



#### Entrees System

| Variable  |     |
|-----------|-----|
| ne_eff    | 2.0 |
| phi_eff   | 0.6 |
| span_eff  | 66. |
| Naisle    | 1.0 |
| tuc_Eff   | 0.1 |
| Fuel_eff  | 13. |
| alt_crz   | 10. |
| Awing_Eff | 18. |
| Npax_eff  | 15. |

#### Variables Intern

| Variable |     |
|----------|-----|
| ne       | 2.0 |
| LDW      | 77. |
| Fuel     | 13. |
| Ifus     | 40. |
| Npax     | 15. |
| ar       | 9.0 |
| Kmto     | 1.0 |
| wAht     | 23. |
| MTOW     | 77. |

#### Sorties System

| Variable |     |
|----------|-----|
| kff      | 1.0 |
| tofl     | 12. |
| kfn_cth  | 0.5 |
| RA_Time  | 24. |
| yapp     | 65. |