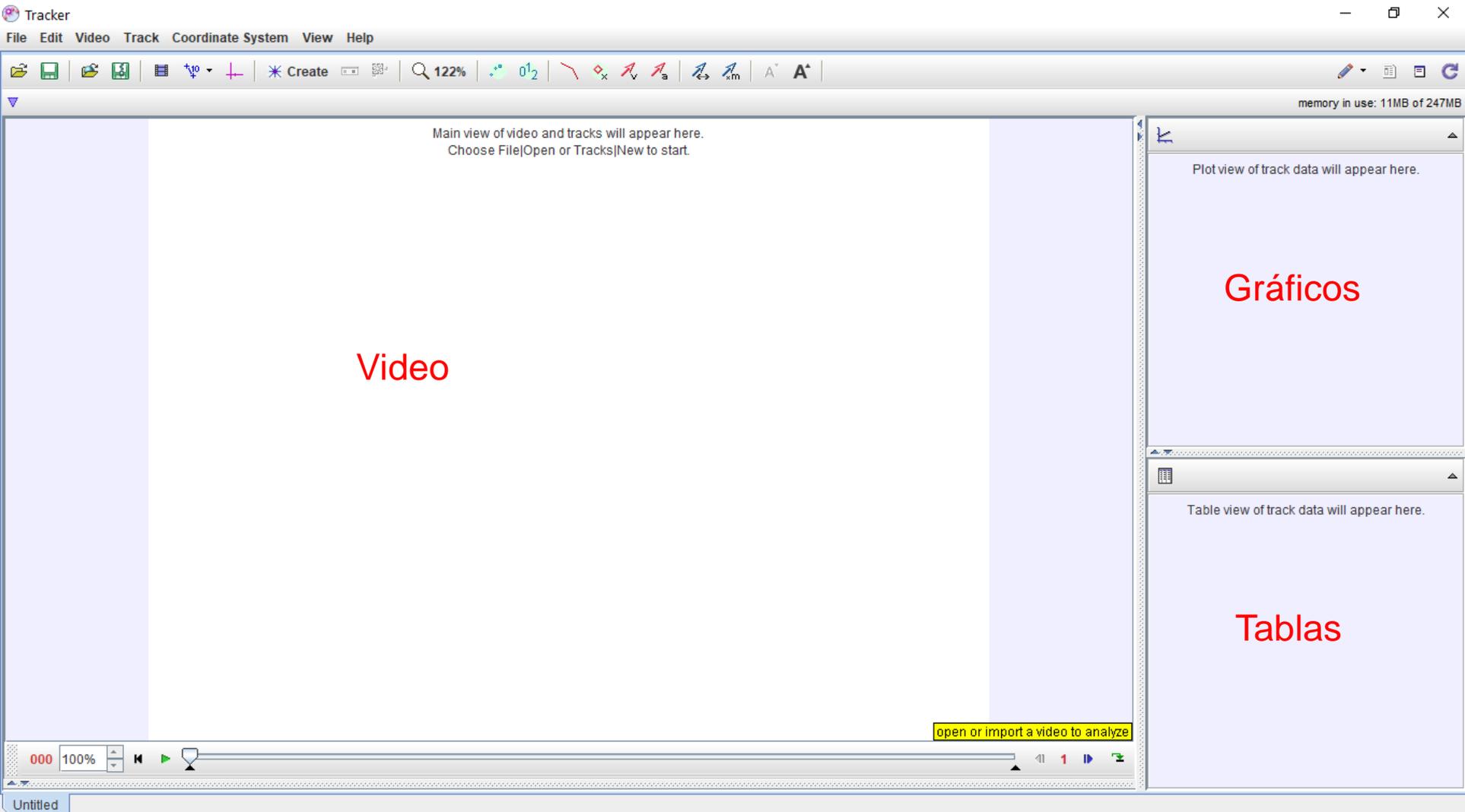
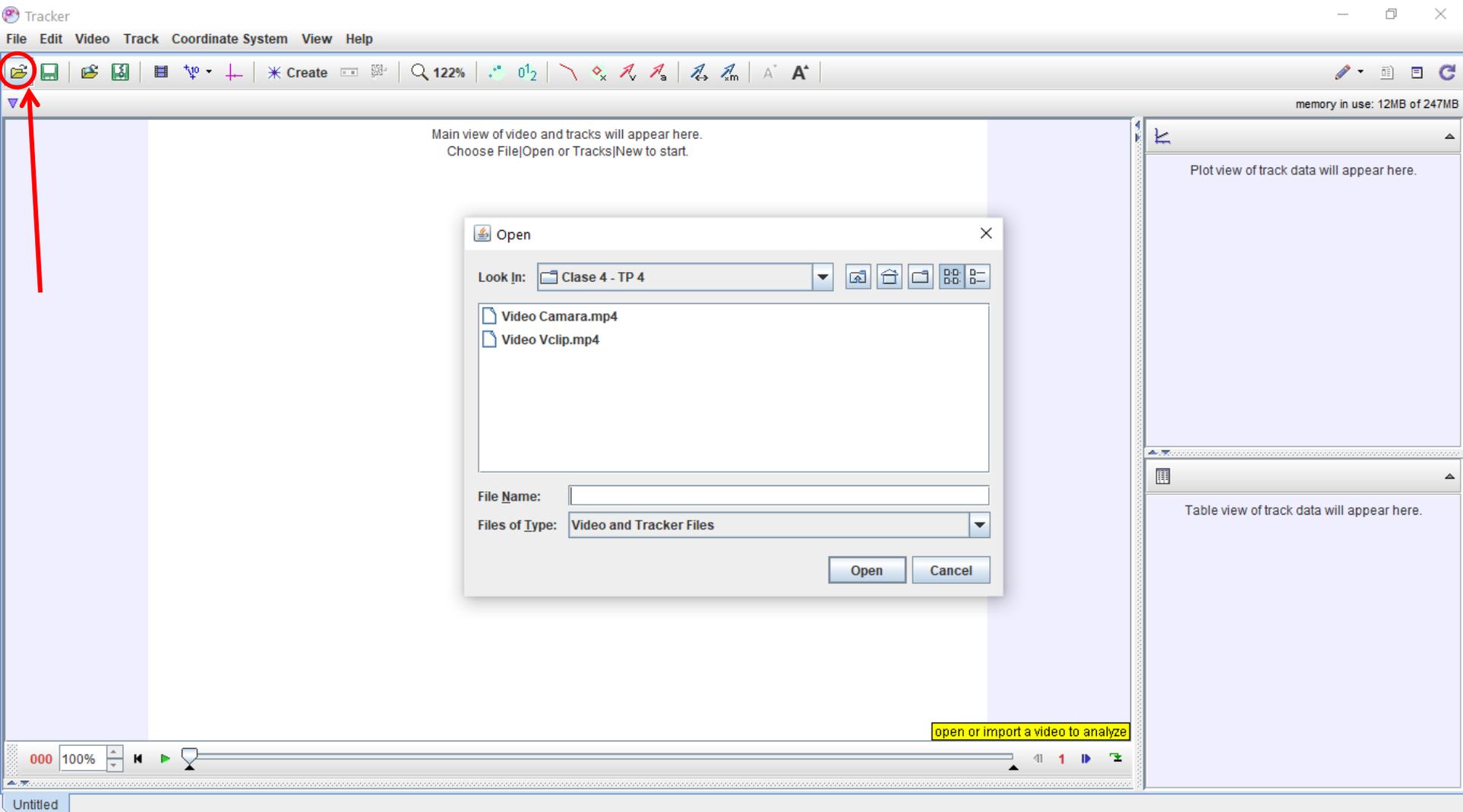


Tracker



Tracker

Abrir archivo de video



Tracker

Corte del video

Tracker

File Edit Video Track Coordinate System View Help

asa 169 g

50 300

Constante del Res Pequeña

10 20 30 40 50 60 70 80 90 cm

169 g

Altura = 0 m

x=-287.5 y=20.71

000 100%

set the origin and angle of the coordinate axes

Video Vclip.mp4

Desplazar los cursores para indicar el primer y el último cuadro del análisis (y así eliminar las partes que no sean de interés)

Tracker

Calibración

File Edit Video Track Coordinate System View Help

New Calibration Stick
Calibration Tape
Calibration Points
Offset Origin

169 g
300

Constante del Res Pequeña

10 20 30 40 50 60 70 80 90 cm

169 g

Altura = 0 m

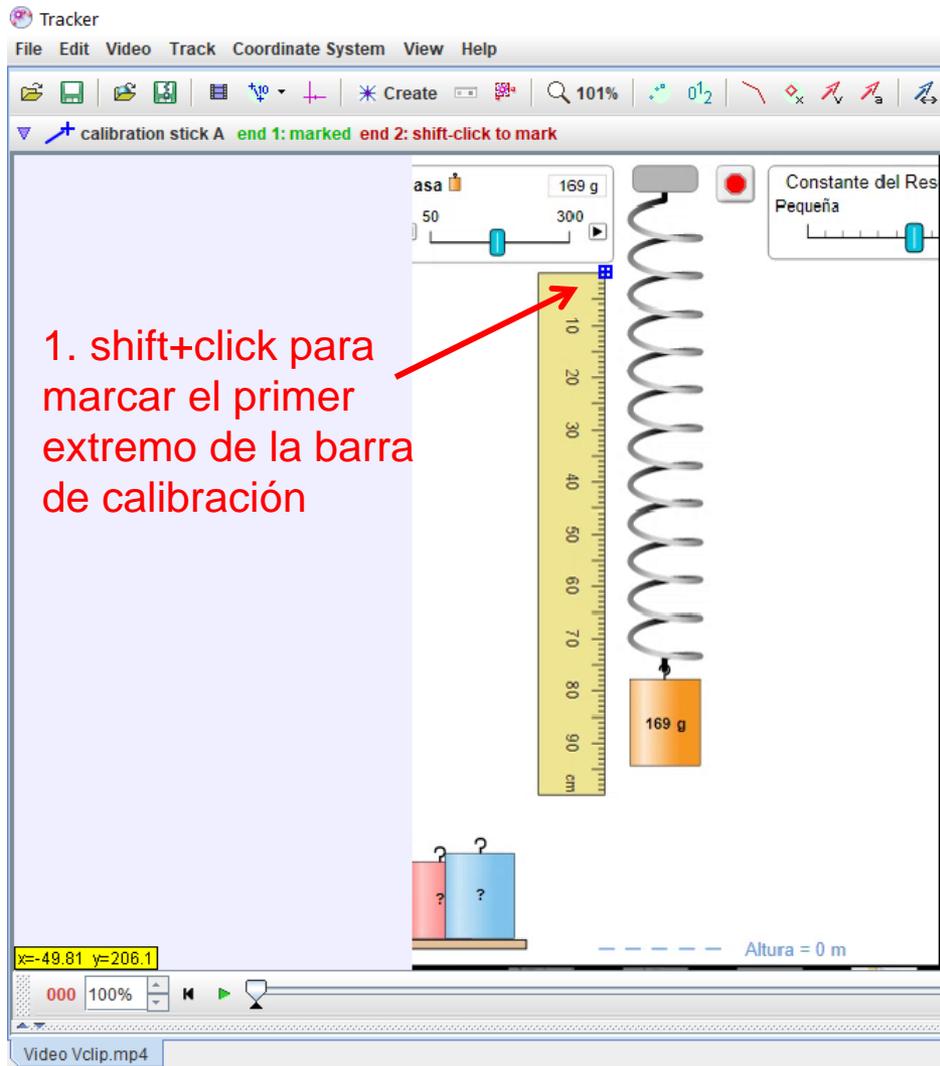
set or review video clip settings

000 100%

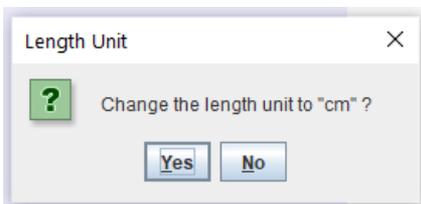
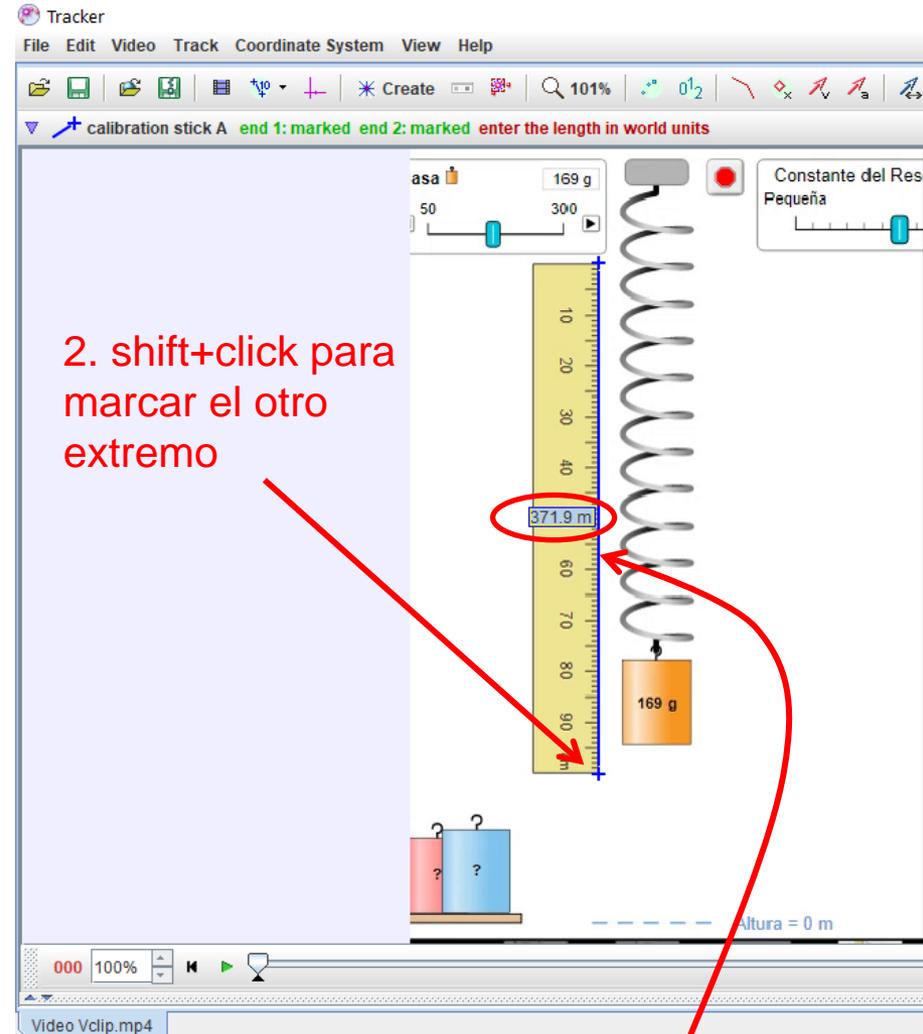
Video Vclip.mp4

Para calibrar las distancias se usa el Calibration Stick. Para esto el video tiene que tener algún objeto que sirva como referencia de tamaño. (En este caso, podemos usar la regla)

Tracker



Calibración



4. Si nos pregunta si queremos cambiar la unidad → Yes
Pueden usar la unidad que quieran

Tracker

Sistema de referencia

The screenshot shows the Tracker software interface. At the top, there is a menu bar (File, Edit, Video, Track, Coordinate System, View, Help) and a toolbar with various icons. Below the toolbar, there are input fields for 'origin pixel position' (185.0, 289.0) and 'angle from horizontal' (0.0°). The main workspace displays a vertical spring-mass system. A vertical ruler on the left indicates height in centimeters, with a dashed line at the bottom labeled 'Altura = 0 m'. A mass of 169 g is attached to the spring. A coordinate system is overlaid on the scene, with a red crosshair at the origin (185.0, 289.0) and a green crosshair at the equilibrium position of the spring (100.0 cm). A blue circle highlights the 'angle from horizontal' field, and a green circle highlights the green crosshair. A yellow box at the bottom right contains the text 'axes selected (set angle to change tilt)'. A video player at the bottom shows 'Video Vclip.mp4' with a 100% zoom and playback controls.

Click para visualizar el sistema de coordenadas. Puede desplazarse para ubicar el origen en el punto deseado (p.ej. en el punto fijo del resorte, en su longitud natural, en la posición de equilibrio)

Los ejes pueden rotarse manualmente o indicando el ángulo acá

Esta marquita indica el eje x positivo

axes selected (set angle to change tilt)

Tracker

Masa puntual

Para crear la masa puntual que vamos a trackear:

- Click en "Create"
- Seleccionar "Point Mass"

169 g

300

100 cm

10 20 30 40 50 60 70 80 90 cm

169 g

altura = 0 m

axes selected (set angle to change tilt)

Tracker

Autotracker

The screenshot shows the Tracker software interface. At the top, the menu bar includes File, Edit, Video, Track, Coordinate System, View, and Help. Below the menu bar is a toolbar with various icons for file operations, zooming, and object manipulation. The main workspace displays a physics simulation of a mass on a spring. A vertical ruler on the left indicates a scale from 0 to 90 cm. A mass labeled '169 g' is attached to the spring. A context menu is open for the mass, with 'mass A' selected. The menu options include Name..., Notes..., Color..., Footprints, Visible, Locked, Autotracker..., Define..., Autostep, Mark by Default, Velocities, Accelerations, Delete Selected Step, Clear Steps, and Delete. A red arrow points to 'mass A' in the menu, and another red arrow points to 'Autotracker...'. A yellow tooltip at the bottom right reads 'mass A selected (set mass on toolbar, shift-click to mark)'. A red text box on the right side of the screen contains the following instructions:

Se abre una ventana. Sobre ella:
-Click en "mass A"
-Seleccionar "Autotracker..."

Tracker

Autotracker

Tracker

File Edit Video Track Coordinate System View Help

mass A m 1.000 kg

Track Control

mass A

Constante del Res Pequeña

Autotracker: mass A position

Search Search This Search Next

Frame 0: No Template

Template: Evolution Rate 20% Automark 4

Search: X-axis Only Look Ahead

Target: Track mass A Point position

To create a new key frame, shift-control-click the video feature of interest. Mouse over the controls above to learn more about settings and adjustments.

Help Show Key Frame Delete Close

click mouse to mark, hit Enter key to clone previous step

Se abre la ventana Autotracker.

Ahora tenemos que seleccionar una parte de la imagen que es la que vamos a trackear (key frame).

Para esto, shift+control+click sobre el punto/objeto en cuestión.

Tracker

Autotracker

The screenshot shows the Tracker software interface. The main window displays a simulation of a mass on a spring. The mass is labeled "mass A" with a mass of 1.000 kg. The spring constant is labeled "Constante del Resorte" with a value of 169 g. A ruler is visible on the left side of the simulation, showing a scale from 0 to 90 cm. The mass is currently at a position of 100.0 cm. The Autotracker control panel is open on the right side, showing the "Frame 0" section with "Template" and "Match" buttons circled in green. The "Evolution Rate" is set to 20% and "Automark" is set to 4. The "Search" section has "X-axis Only" unchecked and "Look Ahead" checked. The "Target" section shows "Track" set to "mass A" and "Point" set to "position".

File Edit Video Track Coordinate System View Help

mass A m 1.000 kg

Track Control

mass A

Al hacer shift+control la flechita del cursor se vuelve un círculo, que debemos ubicar sobre el punto/objeto y hacer click.

Tenemos que elegir alguna zona que sea bien distinguible. Yo elegí la "g". Podría ser alguna esquina de la masa, el ganchito, etc.

El rectángulo punteado muestra la zona donde se buscará el "key frame" en el cuadro siguiente

Acá se muestra la zona elegida como key frame

Autotracker: mass A position

Search Search This Search Next

Frame 0: Template Match

Template: Evolution Rate 20% Automark 4

Search: X-axis Only Look Ahead

Target: Track mass A Point position

Frame 0 (key frame): This key frame defines the template and target shown. Click a Search button to look for matches to the template.

You may drag the target, template or search area to move or resize it. Mouse over the controls above to learn more about settings and adjustments.

Help Show Key Frame Delete Close

x=24.27 cm y=-101.3 cm

mass A selected (set mass on toolbar, shift-click to re-mark highlighted position)

000 100%

Video Vclip

Tracker

Autotracker

The screenshot displays the Tracker software interface. The main window shows a simulation of a mass-spring system. A vertical ruler on the left indicates position in centimeters, with a blue vertical line at 100.0 cm. A mass labeled 'mass A' is attached to a spring. The mass is currently at a position of approximately 80 cm. The mass is highlighted with a red dashed box, and a red arrow points from the 'Search' button in the Autotracker panel to this mass. The Autotracker panel on the right is titled 'Autotracker: mass A position' and contains several controls: a 'Search' button (circled in red), 'Search This' and 'Search Next' buttons, 'Template' and 'Match' icons, 'Evolution Rate' set to 20%, 'Automark' set to 4, 'Search' options for 'X-axis Only' (unchecked) and 'Look Ahead' (checked), and 'Target' set to 'Track mass A' with 'Point' set to 'position'. The bottom status bar shows the coordinates 'x=24.27 cm y=-101.3 cm' and a message 'mass A selected (set mass on toolbar, shift-click to re-mark highlighted position)'. The top menu bar includes 'File', 'Edit', 'Video', 'Track', 'Coordinate System', 'View', and 'Help'. The toolbar contains various icons for creating and editing objects.

Track Control

mass A

Para comenzar el trackeo, click en "Search"

Autotracker: mass A position

Search

Search This

Search Next

Frame 0: Template Match

Template: Evolution Rate 20% Automark 4

Search: X-axis Only Look Ahead

Target: Track mass A Point position

Frame 0 (key frame): This key frame defines the template and target shown. Click a Search button to look for matches to the template.

You may drag the target, template or search area to move or resize it. Mouse over the controls above to learn more about settings and adjustments.

Help Show Key Frame Delete Close

x=24.27 cm y=-101.3 cm

mass A selected (set mass on toolbar, shift-click to re-mark highlighted position)

Video Vclip

Tracker

Autotracker

Mientras corre el trackeo se van viendo las posiciones del objeto en los sucesivos cuadros y los datos (tiempo y posición) van apareciendo en el gráfico y en la tabla

Tracker

File Edit Video Track Coordinate System View Help

mass A m 1.000 kg

memory in use: 34MB of 247MB

Track Control

mass A

asa 169 g

50 300

Constante del Res Pequeña

10 20 30 40 50 60 70 80 90 cm

100.0 cm

169 g

Autotracker: mass A position

Stop Search This Search Next

Frame 16: Template Match

Template: Evolution Rate 20% Automark 4

Search: X-axis Only Look Ahead

Target: Track mass A Point position

Frame 16 (match score 325,1): The match was marked automatically.

Accept Skip

Help Show Key Frame Delete Close

mass A (t, x)

10 0.15 0.20 0.25 0.30 0.35 0.40 0.45 0.50 t (s)

	x (cm)	y (cm)
7	2.788	-98.63
0	2.787	-94.05
3	2.787	-91.36
7	2.788	-85.18
0	2.788	-78.45
3	2.788	-74.95
7	2.788	-68.50
0	2.788	-63.12
3	2.788	-60.69
7	2.788	-57.20
0	2.788	-55.85
3	2.788	-55.05
7	2.788	-56.13
0	2.787	-58.82
3	2.788	-60.70

x=-46.02 cm y=-65.52 cm

015 100%

Video Vclip

mass A selected (set mass on toolbar, shift-click to mark)

Altura = 0 m

Tracker

Autotracker

The screenshot displays the Tracker software interface. The main window shows a simulation of a mass-spring system. A mass labeled 'mass A' is attached to a spring. The mass is currently at a position of 100.0 cm on a vertical scale. The spring constant is labeled 'Constante del Res Pequeña'. The mass is currently at 169.0 g. The Autotracker window is open, showing the search results for 'mass A position'. The search results show a match score of 308.0 for Frame 246. The Autotracker window has a 'Close' button circled in red. A red arrow points to the 'Close' button with the text 'Cuando termina el proceso, cerrar la ventana'.

Tracker

File Edit Video Track Coordinate System View Help

mass A m 1.000 kg

memory in use: 41MB of 247MB

Track Control

mass A

asa 169.0 g

Constante del Res Pequeña

100.0 cm

10 20 30 40 50 60 70 80 90 cm

Autotracker: mass A position

Search Search This Search Next

Frame 246: Template Match

Template: Evolution Rate 20% Automark 4

Search: X-axis Only Look Ahead

Target: Track mass A Point position

Frame 246 (match score 308.0): The match was marked automatically.

Close

Cuando termina el proceso, cerrar la ventana

mass A selected (set mass on toolbar, shift-click to re-mark highlighted position)

mass A (t, x)

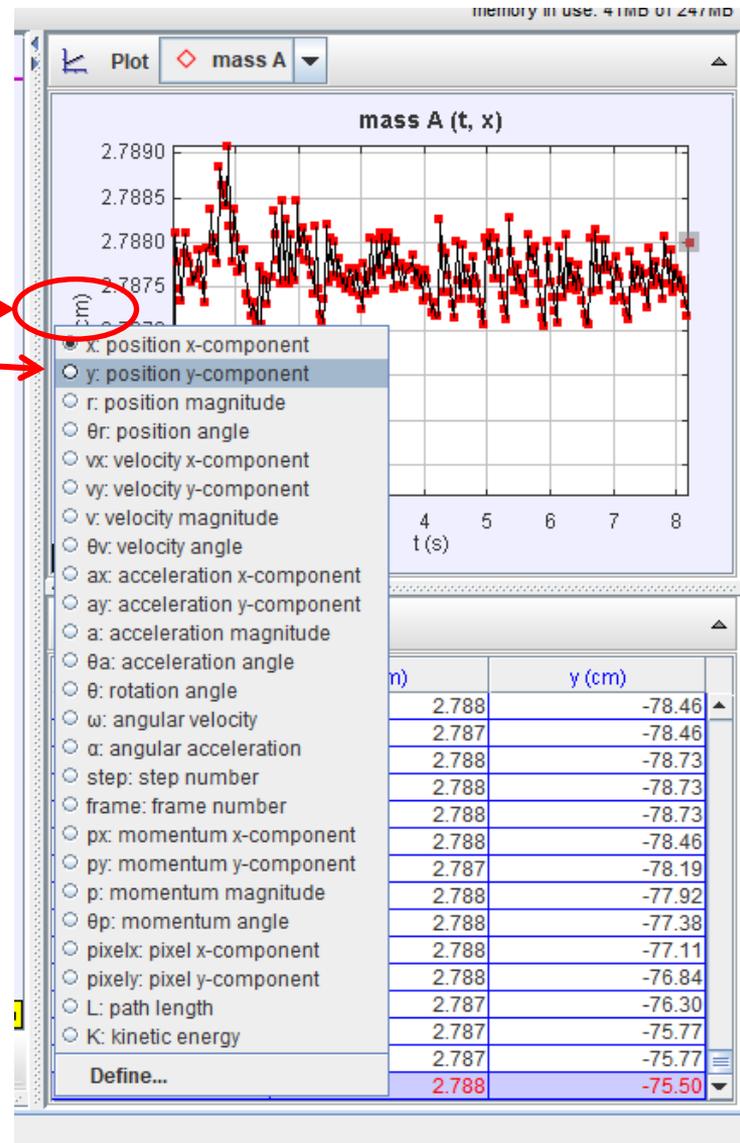
t (s)	x (cm)	y (cm)
2.788	2.788	-78.46
2.787	2.787	-78.46
2.788	2.788	-78.73
2.788	2.788	-78.73
2.788	2.788	-78.46
2.787	2.787	-78.19
2.788	2.788	-77.92
2.788	2.788	-77.38
2.788	2.788	-77.11
2.788	2.788	-76.84
8.100	2.787	-76.30
8.133	2.787	-75.77
8.167	2.787	-75.77
8.200	2.788	-75.50

Tracker

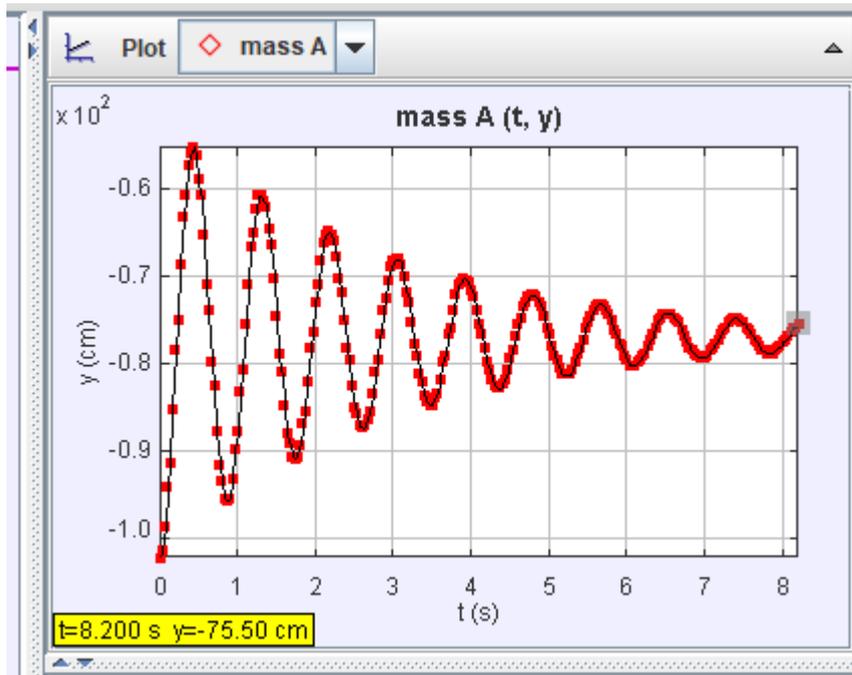
Gráfico

El gráfico se ve como un valor constante con "ruido" estadístico. Esto es porque está graficada la coordenada x

Para seleccionar la coordenada y:
-Click en el nombre del eje (x (cm))
-Seleccionar componente y



Ahora el gráfico se ve así:



Tracker

Tabla

Haciendo click en "Table" se puede elegir qué datos queremos que aparezcan en la tabla.

En este caso, además del tiempo, sólo nos importa la coordenada y



t (s)	y (cm)
7.733	-78.46
7.767	-78.46
7.800	-78.73
7.833	-78.73
7.867	-78.73
7.900	-78.46
7.933	-78.19
7.967	-77.92
8.000	-77.38
8.033	-77.11
8.067	-76.84
8.100	-76.30
8.133	-75.77
8.167	-75.77
8.200	-75.50

The screenshot shows the Tracker software interface. At the top, there are window controls and a toolbar. The main area is divided into a plot window and a table window. The plot window, titled "mass A (t, y)", shows a graph of y (cm) versus t (s) for "mass A". The y-axis ranges from -1.0 to -0.6 (multiplied by 10²), and the x-axis ranges from 0 to 8. A red dashed line with square markers shows a sinusoidal wave. A yellow highlight is on the plot at t=8.200 s, y=-75.50 cm. Below the plot is a "Visible Table Columns" dialog box for "mass A" with checkboxes for x, y, r, θr, vx, vy, v, θv, ax, ay, a, θa, px, py, p, θp, θ, ω, α, K, step, frame, pixelx, pixely, and L. The "Table" button in the dialog is circled in red. Below the dialog is a toolbar with a yellow highlight on the "Table" button and the text "on toolbar, shift-click to re-mark highlighted position)". At the bottom, there is a playback control bar with a yellow highlight on the "1" button.

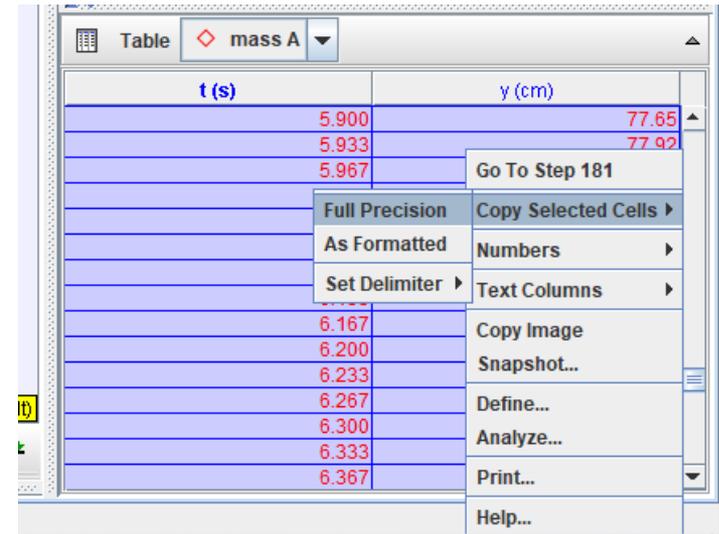
t (s)	x (cm)	y (cm)
7.733	2.788	-78.46
7.767	2.787	-78.46
7.800	2.788	-78.73
7.833	2.788	-78.73
7.867	2.788	-78.73
7.900	2.788	-78.46
7.933	2.787	-78.19
7.967	2.788	-77.92
8.000	2.788	-77.38
8.033	2.788	-77.11
8.067	2.788	-76.84
8.100	2.787	-76.30
8.133	2.787	-75.77
8.167	2.787	-75.77
8.200	2.788	-75.50

Tracker

Copiar o exportar datos

Para el Origin, lo más fácil es copiar y pegar los datos:

- Seleccionar todos los datos (las celdas seleccionadas cambian de blanco a azul)
- Click derecho sobre la tabla
 - "Copy Selected Cells"
 - "Full Precision"
- Pegar en el Origin

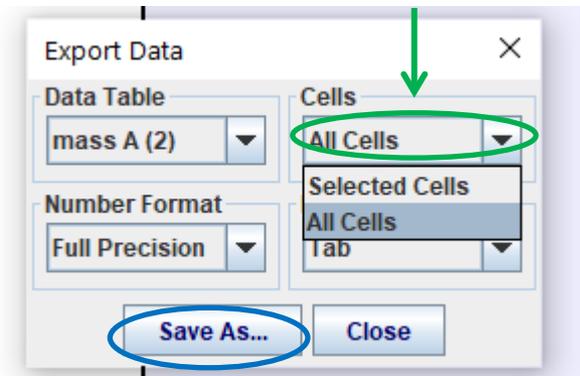
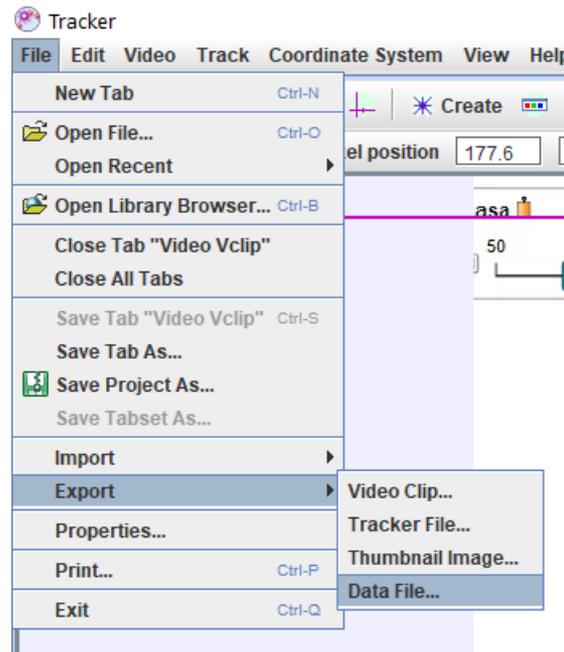


Alternativamente, quienes quieran generar un archivo de datos:

- Seleccionar "File" en el menú
 - "Export"
 - "Data File..."

-En la ventana que se abre (Export Data), seleccionar "All Cells"

-Save As...



Tracker

Errores

Cuáles serían las incertezas en las determinaciones del tiempo y la posición?

De qué factores dependen?

Qué hay que tener en cuenta?