Measurement of gravity acceleration using video analysis

We made a video of freefall stone.

Measurement of the first group

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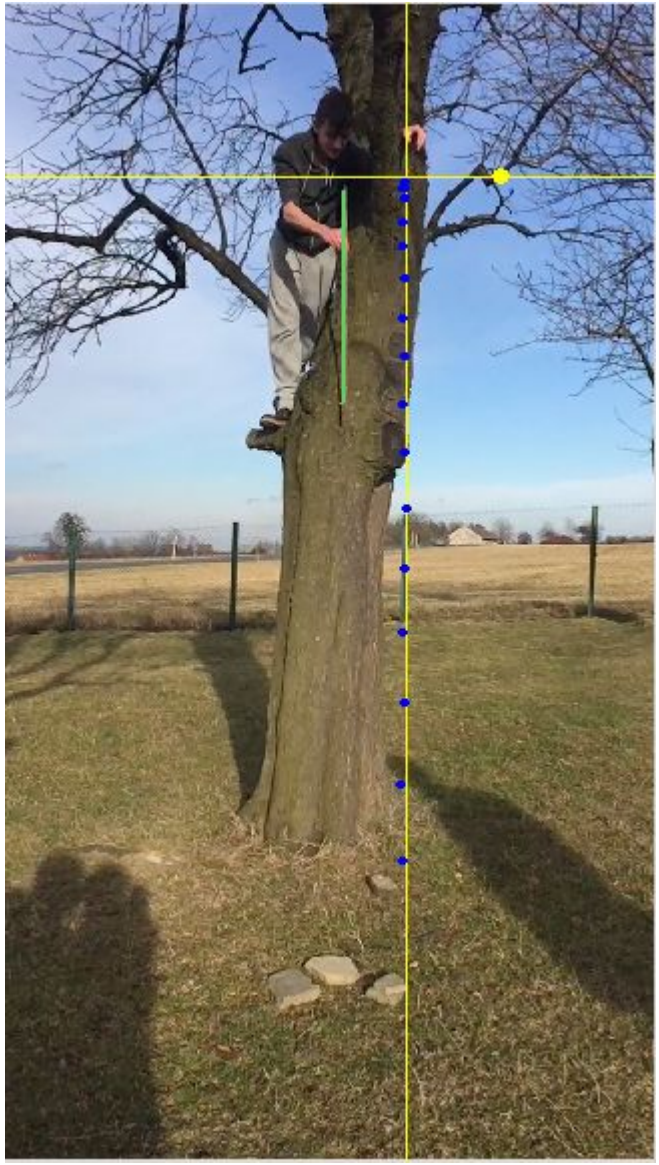
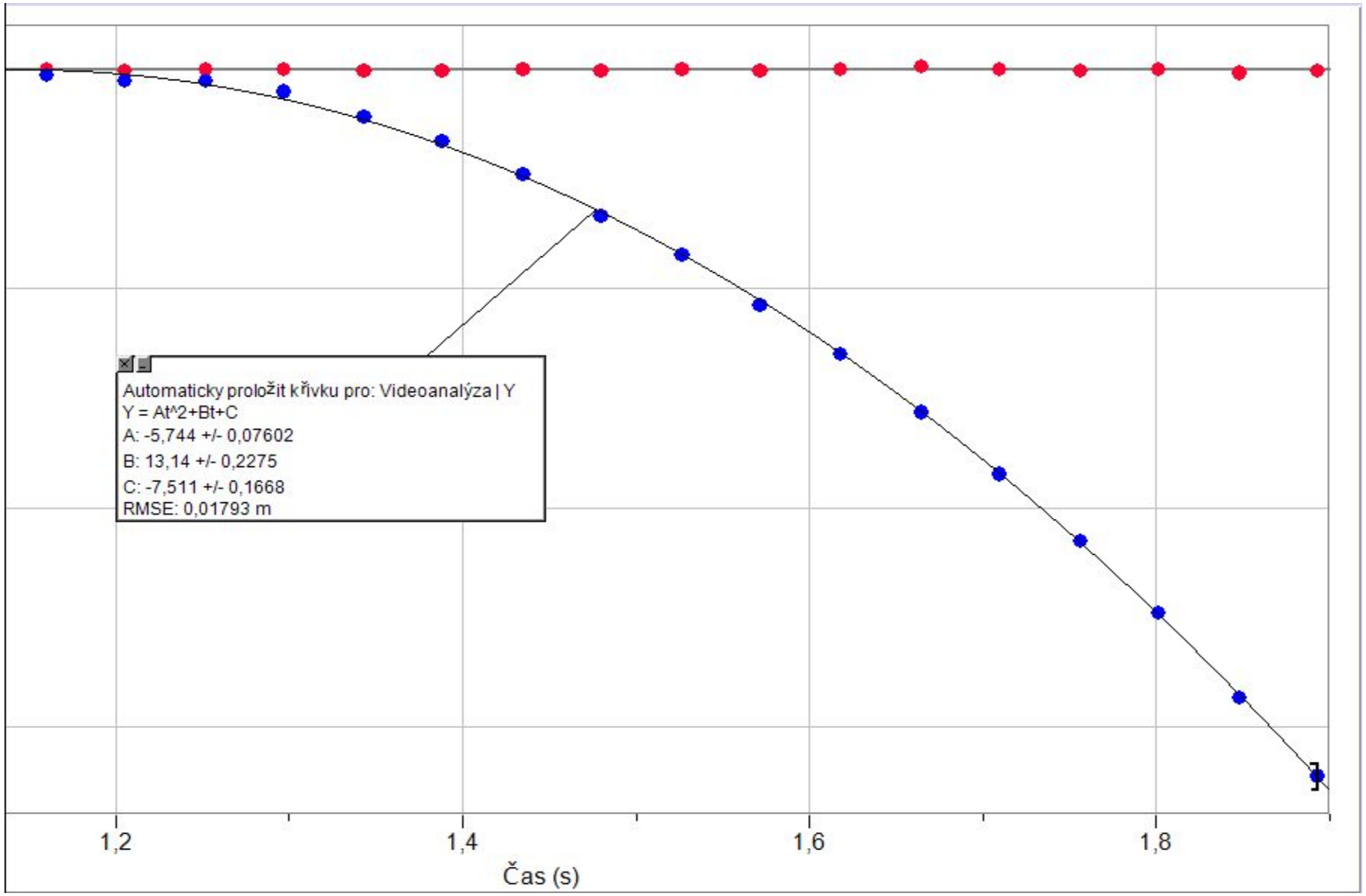
We analyzed the video in program Logger Pro.



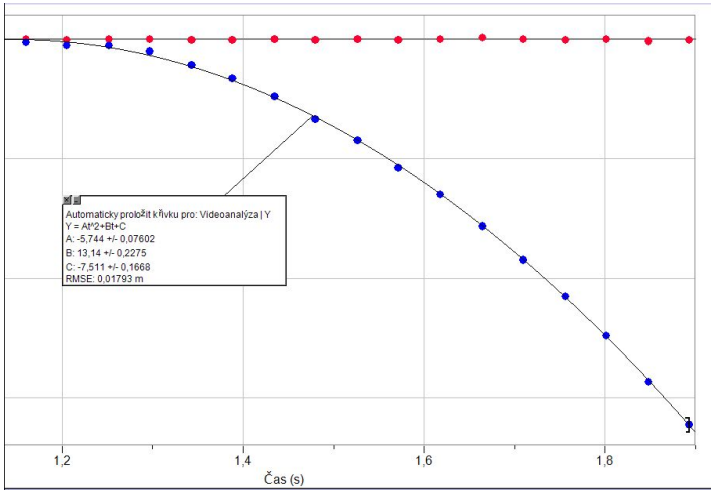
We approximated measured points with a parabola.



$$s = \frac{g \cdot t^2}{2} \qquad y = At^2 + Bt + C$$

$$A \simeq \frac{g}{2} \quad \rightarrow \quad g = 2A$$

$$A = 5{,}74 \pm 0{,}07 \quad \rightarrow \quad g = (11{,}48 \pm 0{,}14)\, m \cdot s^{-2}$$

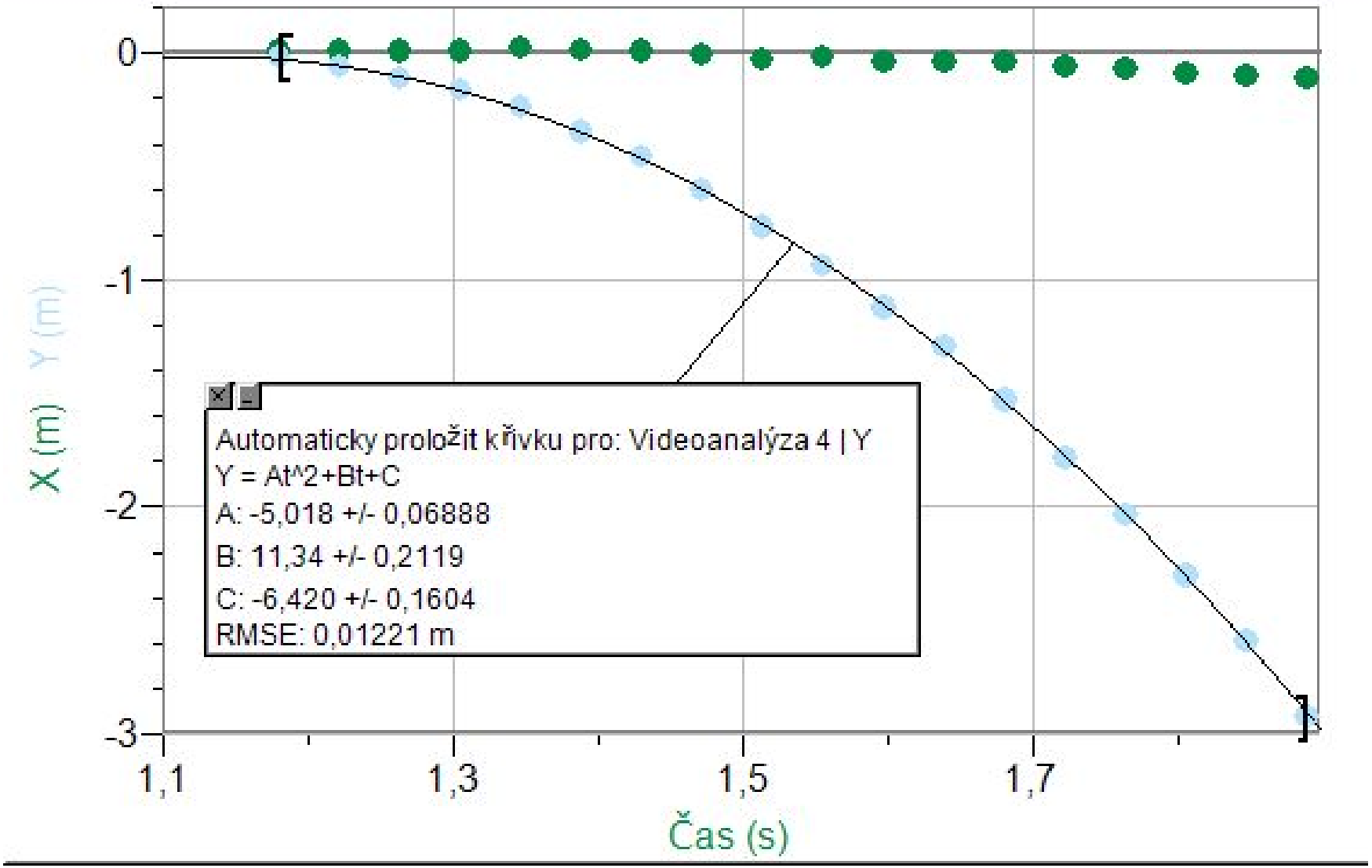


$$g = (11{,}48 \pm 0{,}14)\, m \cdot s^{-2}$$

The measurement was inaccurate because we had a small video resolution.

Measurement of the second group

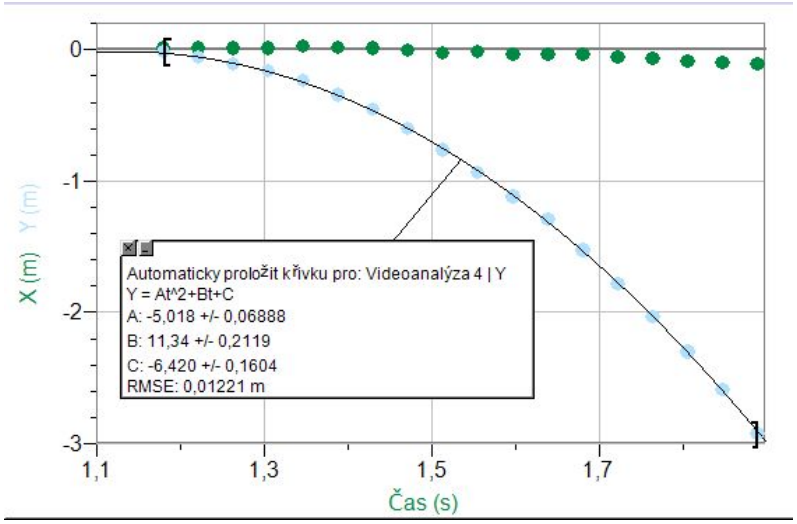
Authors: Oliver Klus, Kristián Kryška , Jan Horký, Marek Klembara


0
-1
-2
-3
1,1
1,3
1,5
1,7
Čas (s)
X (m)
Y (m)
Automaticky proložit křivku pro: Videoanalýza 4 | Y
Y = At^2+Bt+C
A: -5,018 +/- 0,06888
B: 11,34 +/- 0,2119
C: -6,420 +/- 0,1604
RMSE: 0,01221 m

$$s = \frac{g \cdot t^2}{2} \qquad y = At^2 + Bt + C$$

$$A \simeq \frac{g}{2} \quad \rightarrow \quad g = 2A$$

$$A = 5{,}018 \pm 0{,}068 \quad \rightarrow \quad g = (10{,}04 \pm 0{,}14)\, m \cdot s^{-2}$$



$$g = (10{,}04 \pm 0{,}14)\, m \cdot s^{-2}$$