How to Engage Students in a Physics Course through Capture and Analysis of Their Own Video Clips

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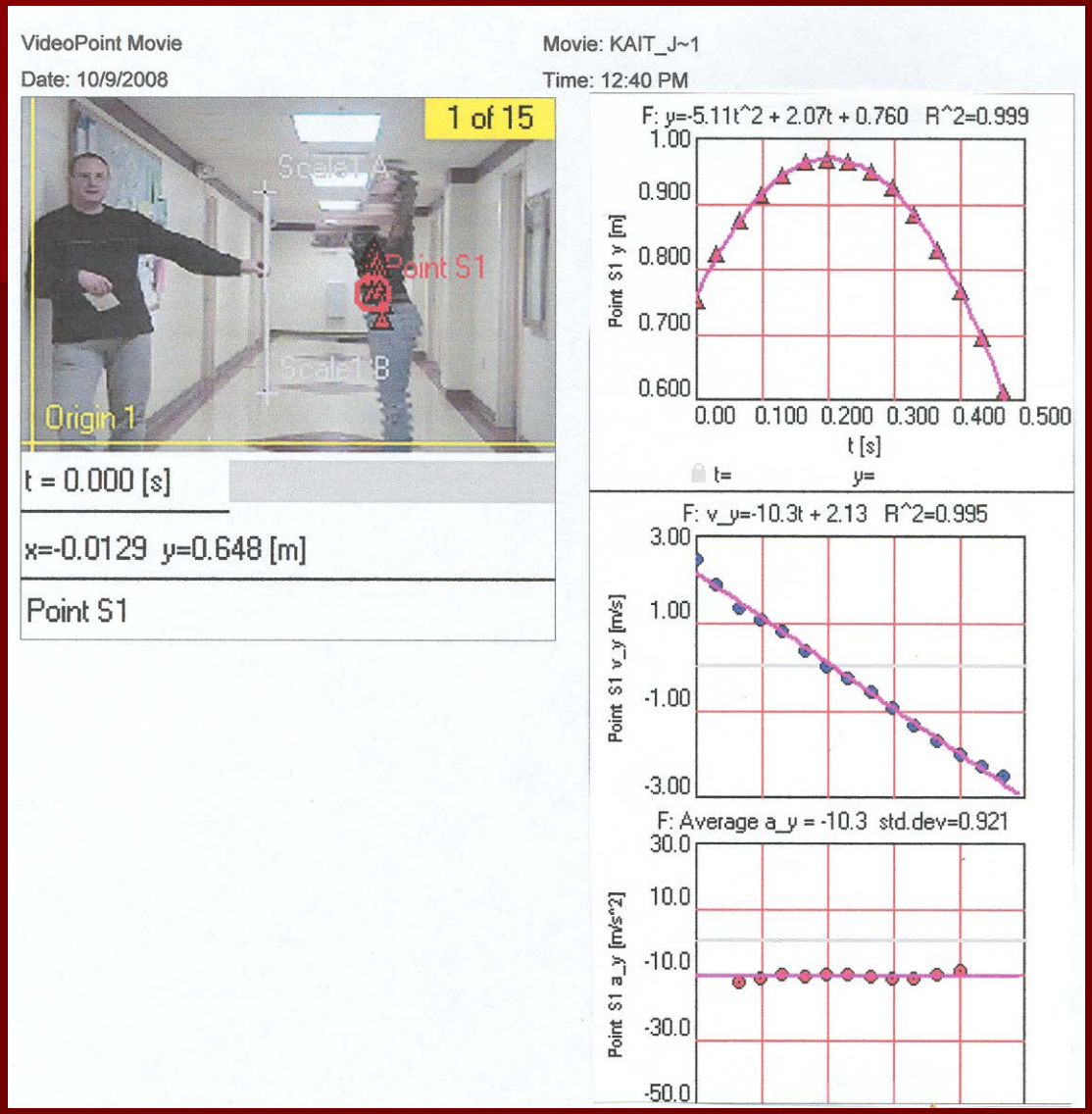
Abstract

- **I will address how to use digital video motion analysis as a teaching tool in an introductory physics course. This presentation focuses on a *Physics for Movement Science* course geared towards Physical Education, Athletic Training and Exercise Science majors. It is explained how students capture their own video clips and analyze them.**
- **Some of the video clips are presented.**



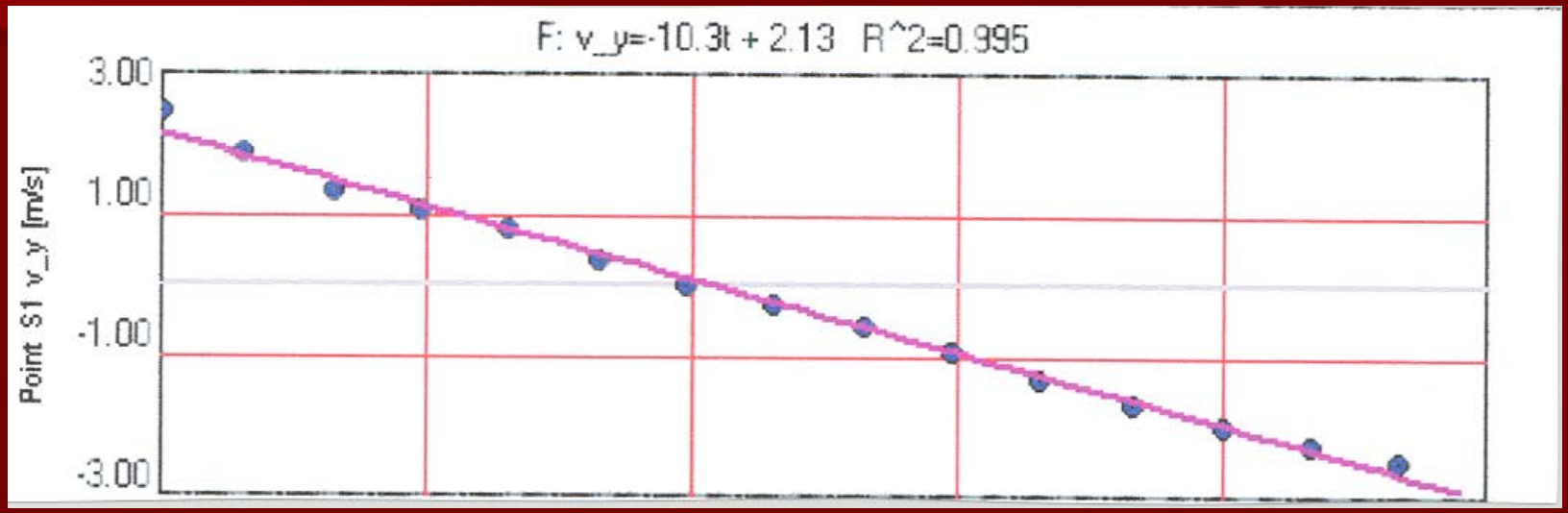
Vertical jump movie clip and motion analysis

Physics of the Vertical Jump

- Question 1
- Before analyzing the jump, predict the shapes of the graphs that represent the vertical displacement and vertical velocity of the hip as a function of time. Show your predictions.

- Question 2
- Observe the shape of the vertical displacement vs. time and vertical velocity vs. time graphs. What differences, if any, were there between these graphs obtained through VideoPoint analysis and your predicted graphs?

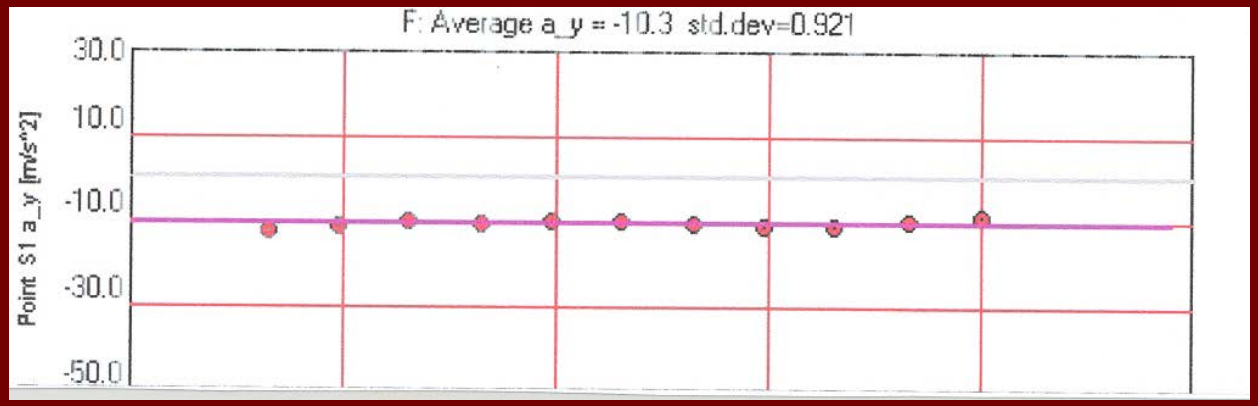
Vertical Jump Cont.



- Question 3
- Describe the motion of the individual during the jump. Was his/her vertical velocity constant throughout the jump? Did the magnitude and/or direction of the vertical velocity change throughout the jump? Discuss your findings.

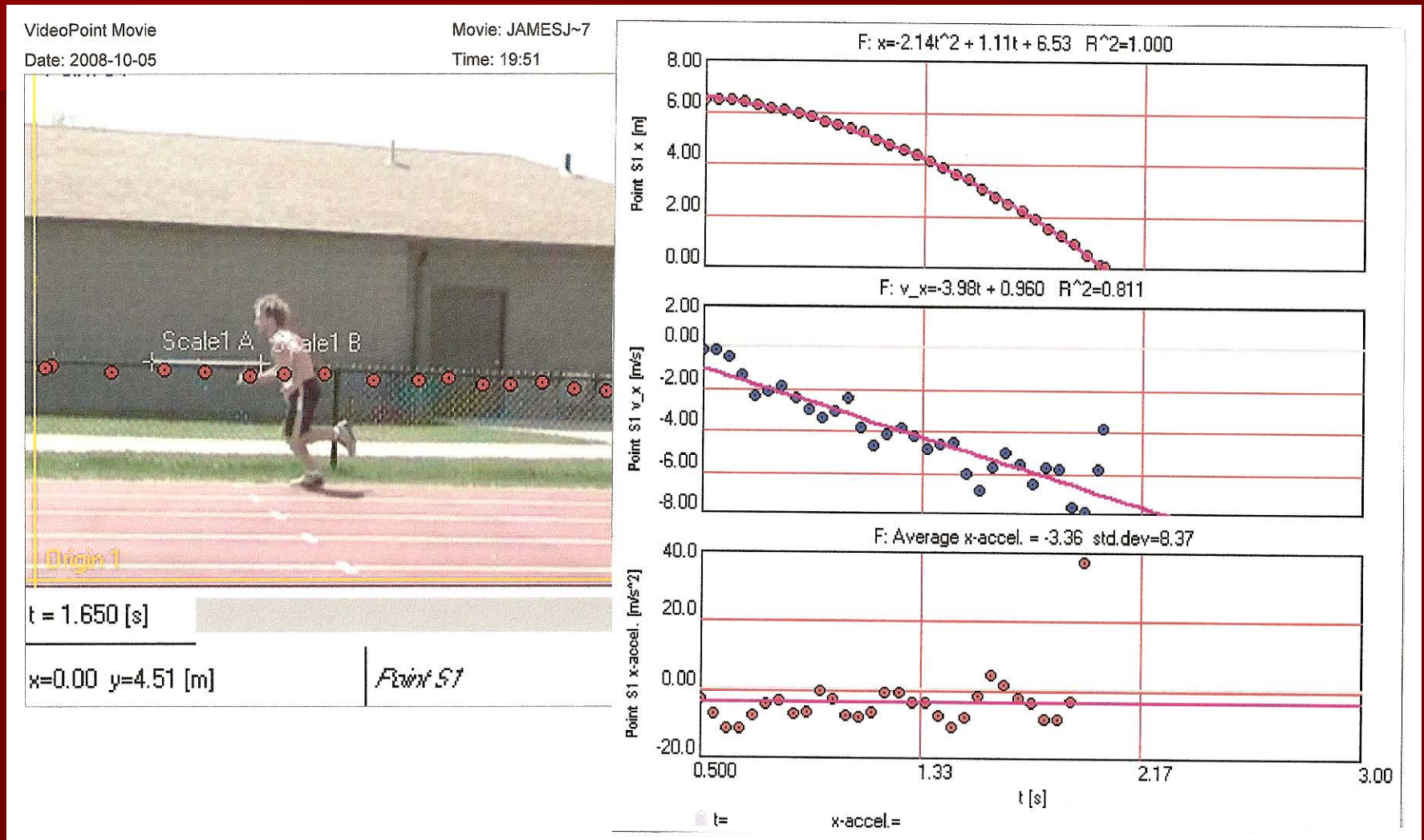
Vertical Jump Cont.

- Question 4
- Find the following values by analyzing the vertical motion graphs:
- Vertical Velocity at the peak of the jump _____[m/s]
- Vertical Acceleration at the peak of the jump _____[m/s/s]



- Question 5
- What was the jumper's acceleration? Was it constant? Discuss the magnitude and direction of the acceleration throughout the jump.

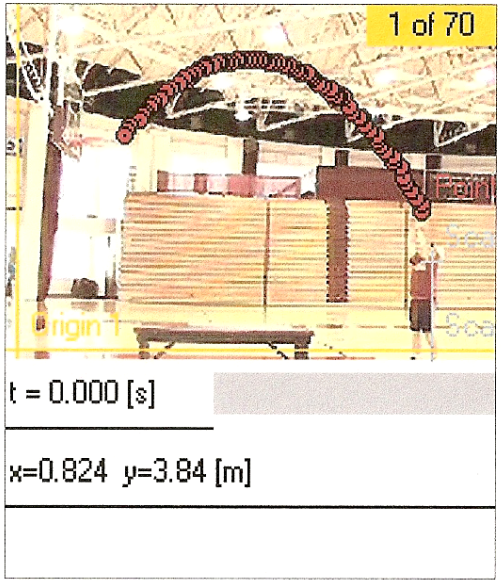
Horizontal motion in one dimension



Projectile in Sports

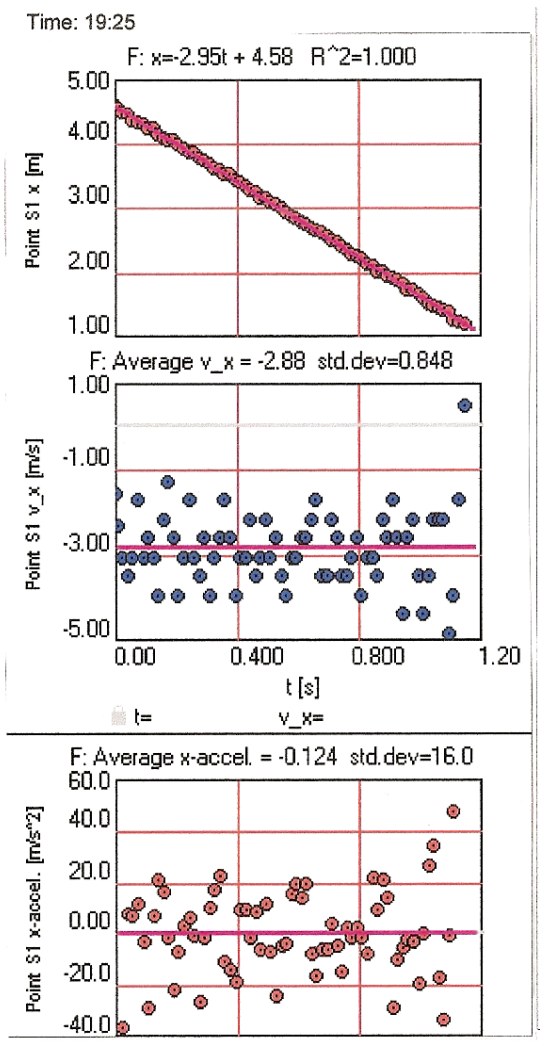
VideoPoint Movie

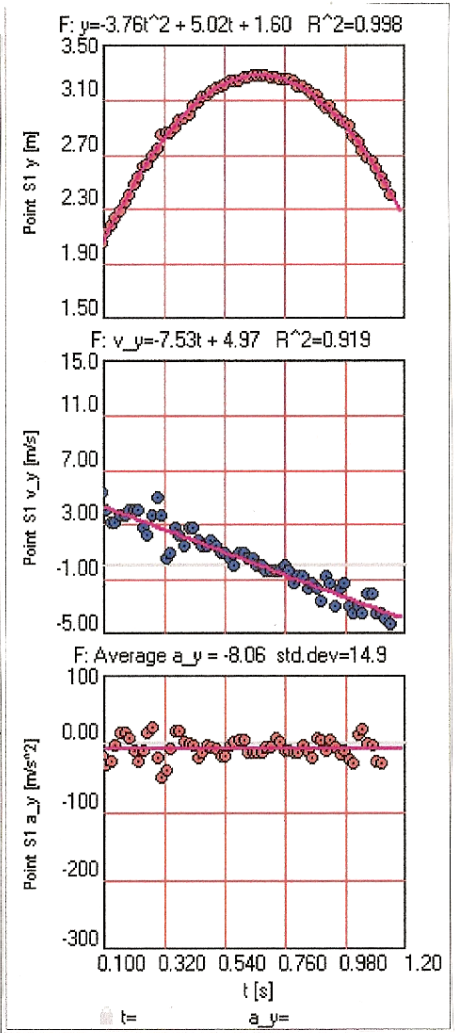
Date: 2008-10-05



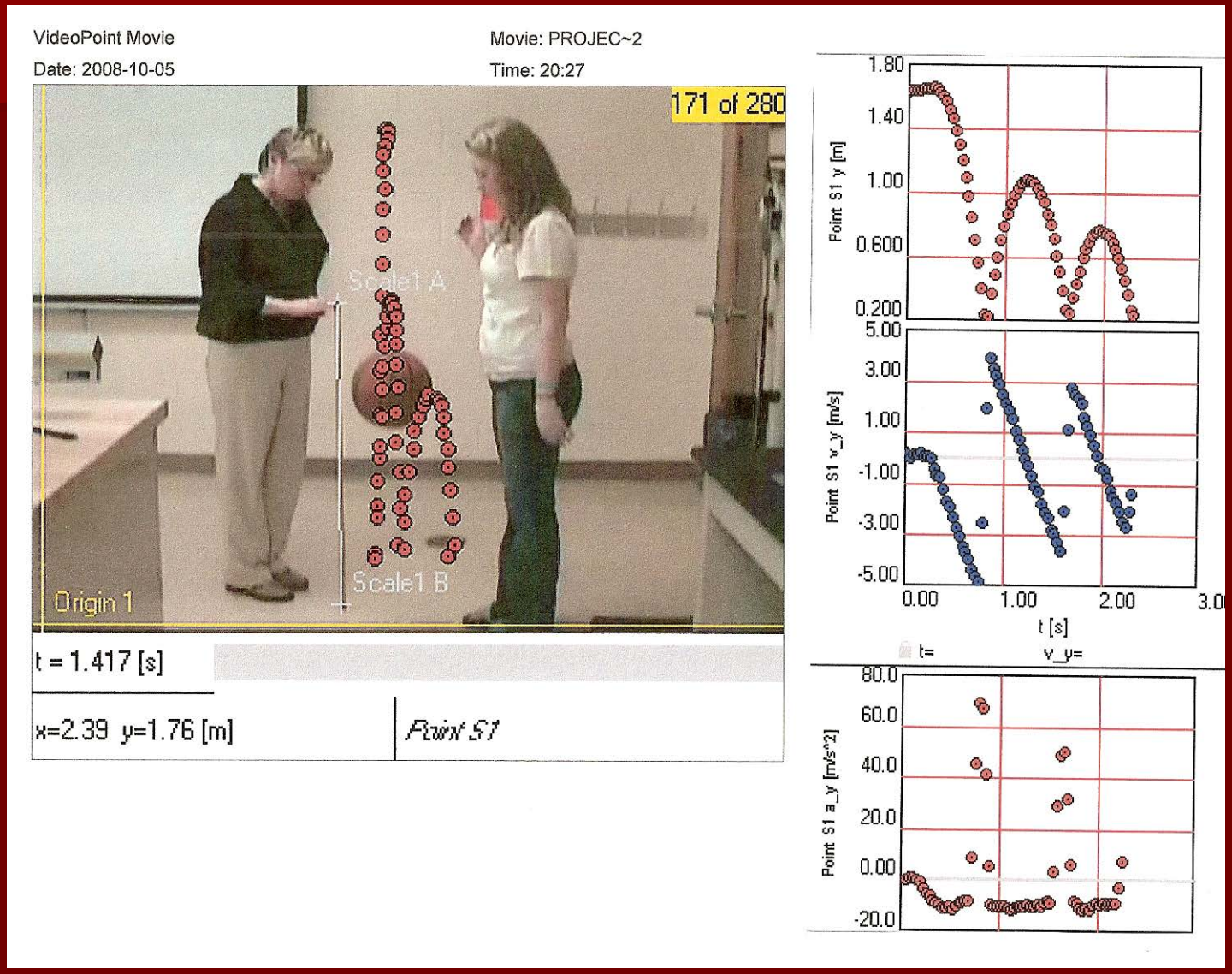
Movie: JAMESJ~2

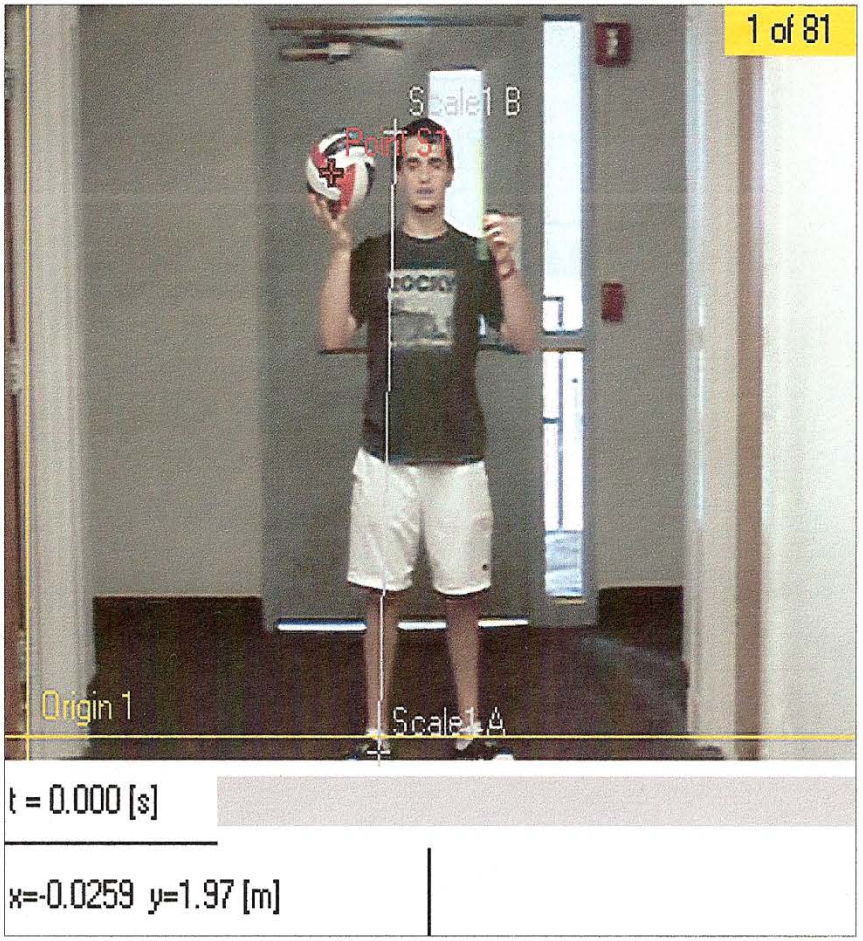
Time: 19:25

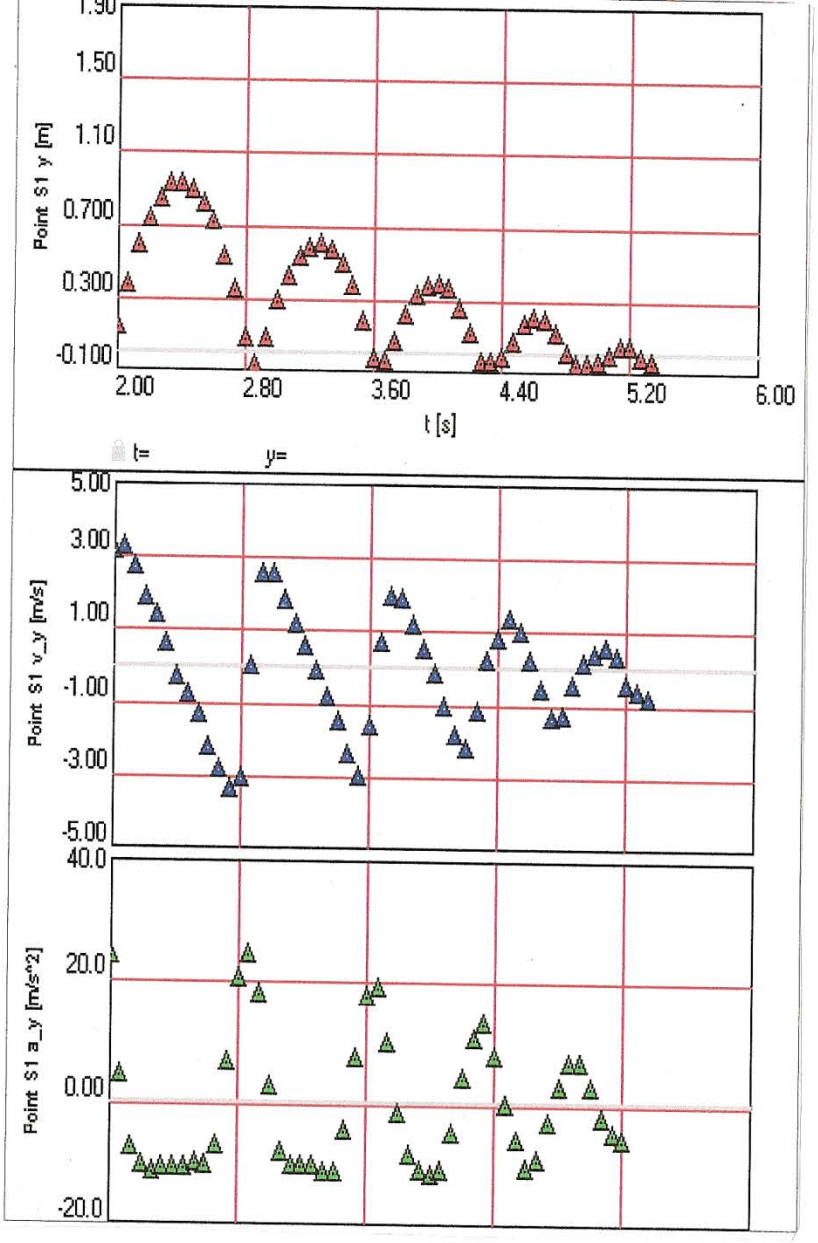




Projectiles in Sports







Movie analysis allows study of semi-elastic collision (types of collision, coefficient of restitution)

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