Study Of Coupled Harmonic Oscillations On An Air-Track

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Aim:

- The aim of the experiment was to study the motions of a spring mass system consisting of two masses coupled with a spring.

What are Coupled Oscillations?

- Coupled Oscillations occur when two or more oscillating systems are connected in such a manner as to allow mechanical energy to be exchanged between them.

Experimental Setup

- The experimental setup consisted of two masses coupled with a spring. The major difficulty with experiments of this type is the elimination of dissipative forces like friction which renders the experiments very difficult. To eliminate friction a frictionless air track was used.

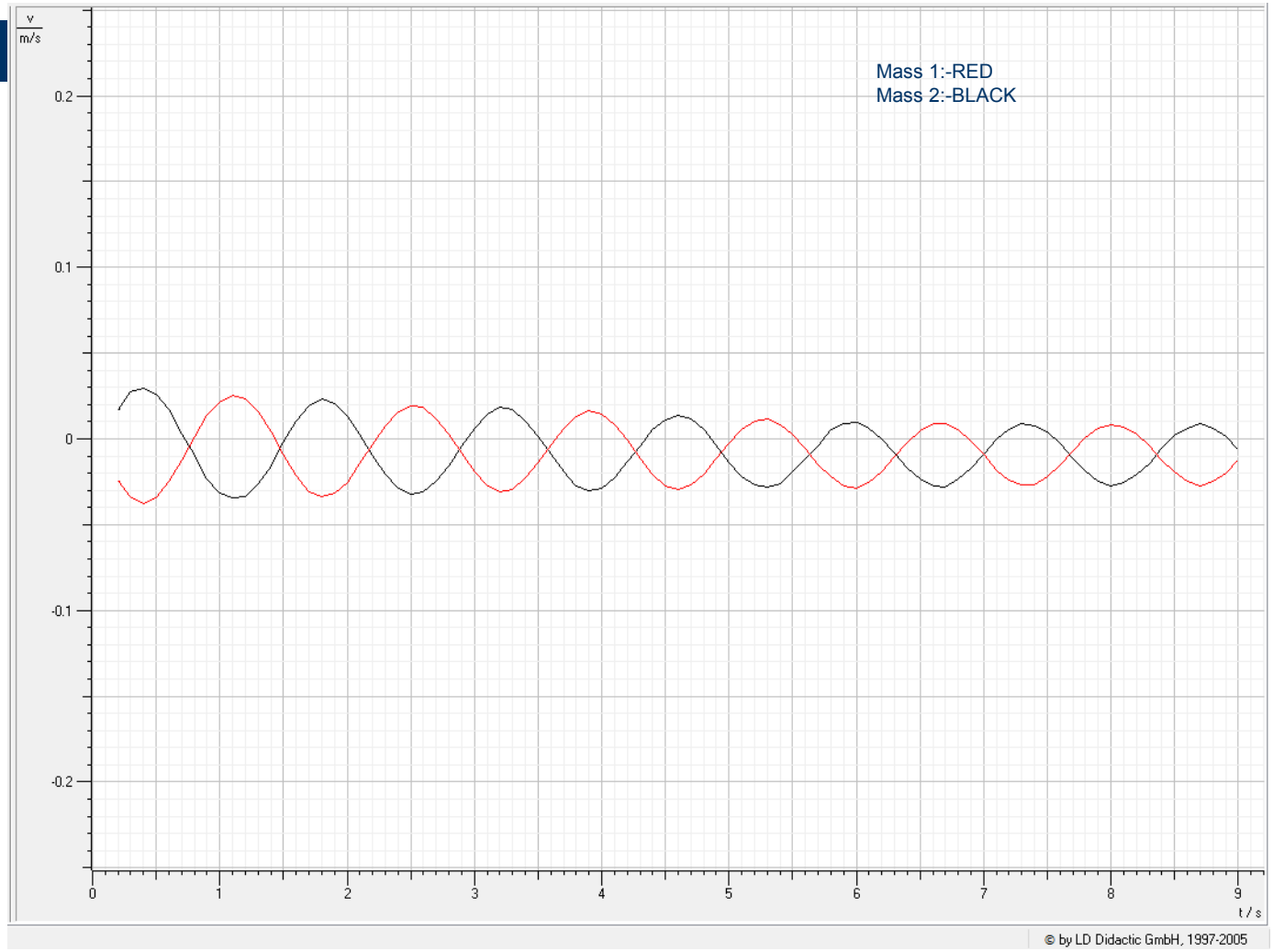
Observing motions:

- Observations of motions in mechanics experiment is another important problem. For this purpose we used a VideoCom motion sensing camera along with its associated software package.

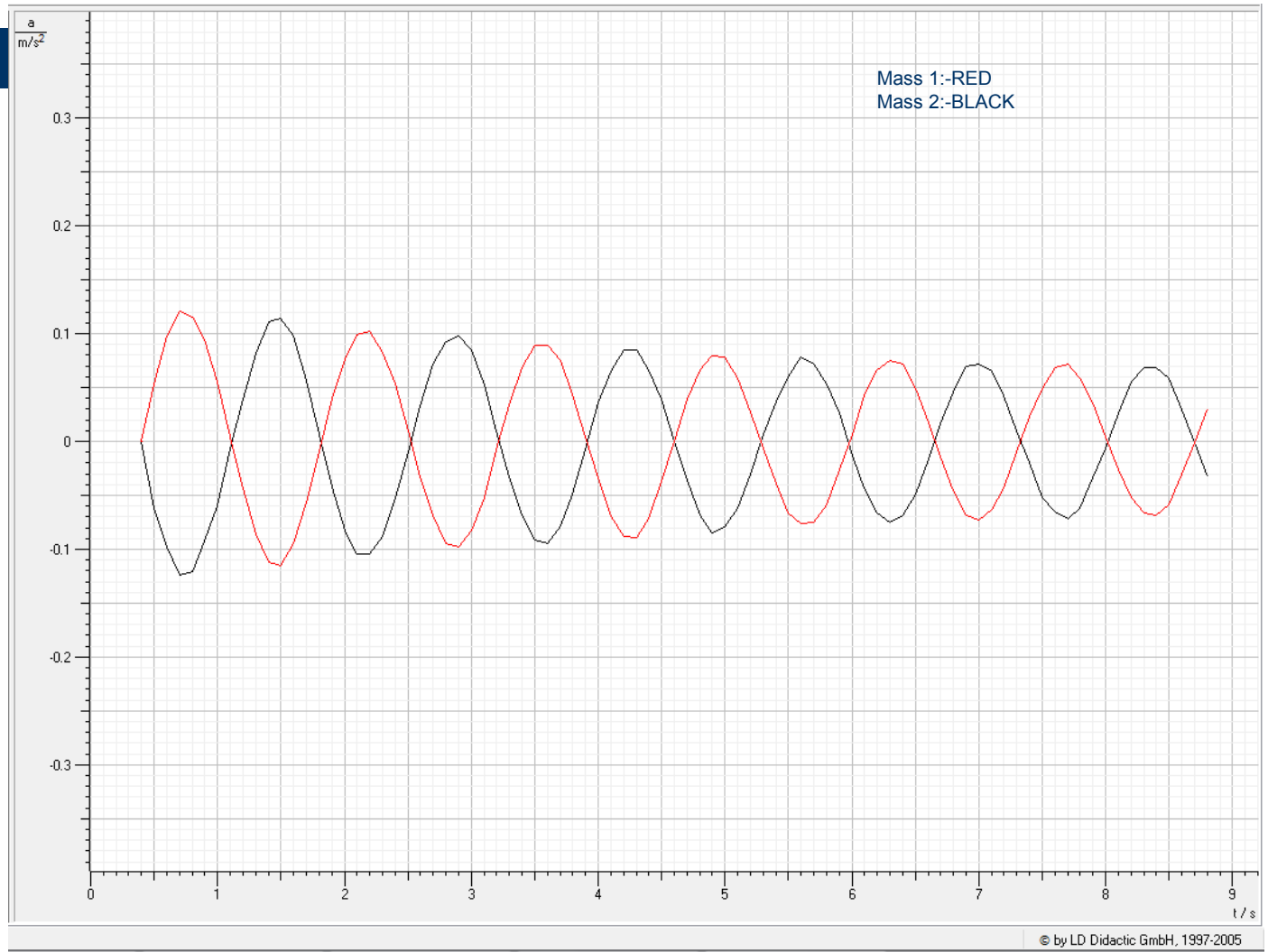
Result:

- The velocity, acceleration and kinetic energy plots of the two bodies were traced.
- Some of the plots are shown on the subsequent pages.

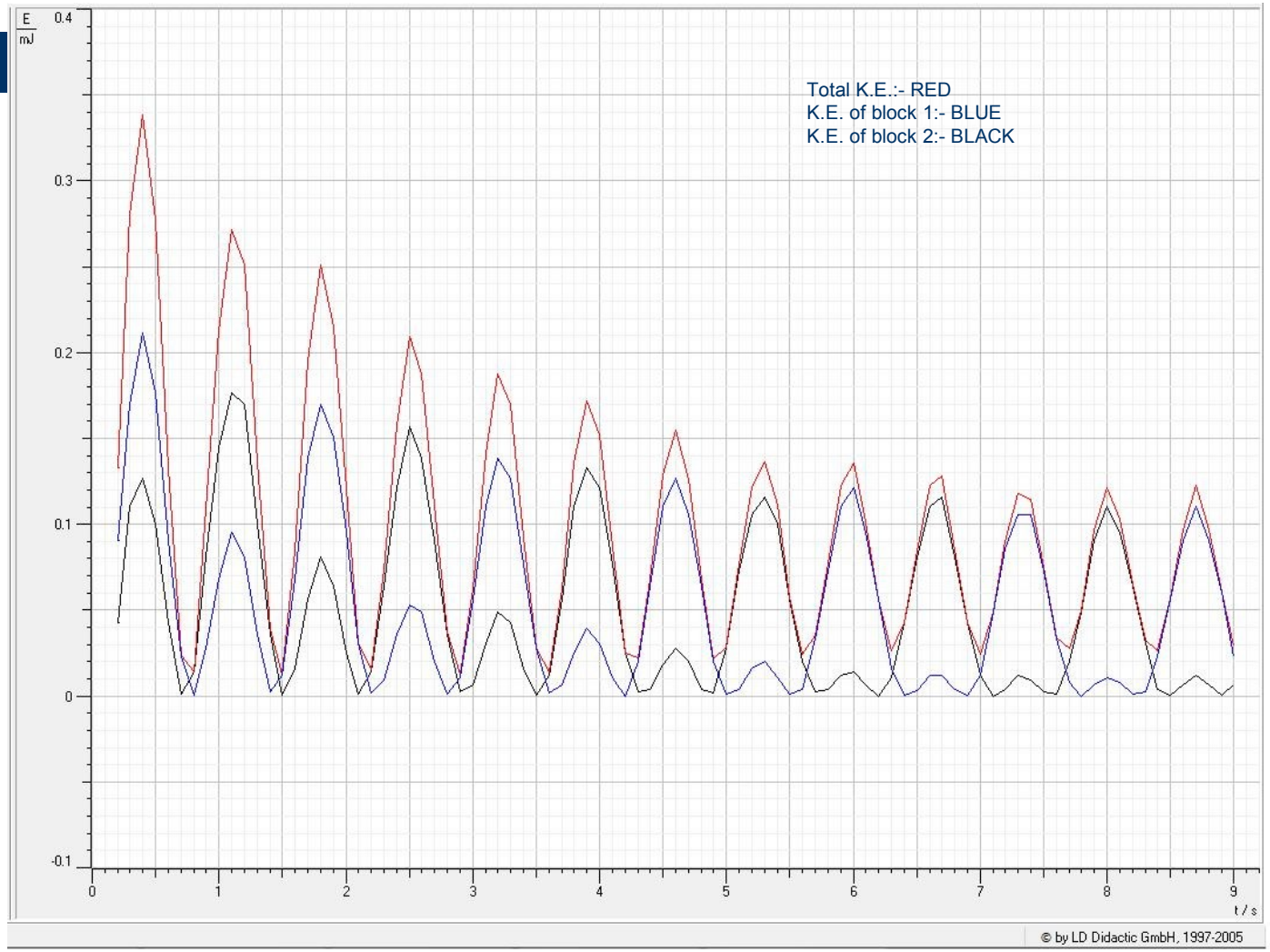
Velocity Plot:-



Acceleration Plot:-



Kinetic Energy Plot:



Conclusion and Applications:-

- These type of experiments are useful to study the coupled harmonic oscillations in a generalized manner. The same setup can be used to study the interaction between coupled systems having more than two bodies.
- Models involving coupled oscillators are used to explain many physical phenomena.

  e.g. Linear molecules can be treated as coupled oscillators, in order to explain their properties.

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