Sonata No. 1 Op.78 in G

violin and piano (1879)

- Motion that repeats at regular intervals of time

Definitions

- **Oscillation**
  - One complete round trip of the motion

Definitions

- **Period**
  - The time required for one complete oscillation

Definitions

- Frequency
  - The number of oscillations per second

Definitions

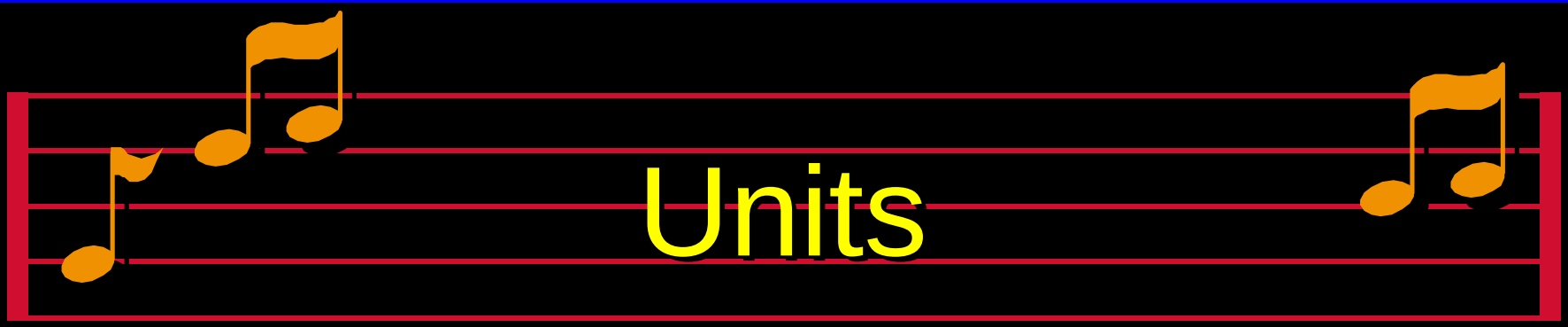
- Equilibrium Position
  - The rest (or neutral) position

Definitions

- Displacement
  - The distance from the equilibrium position

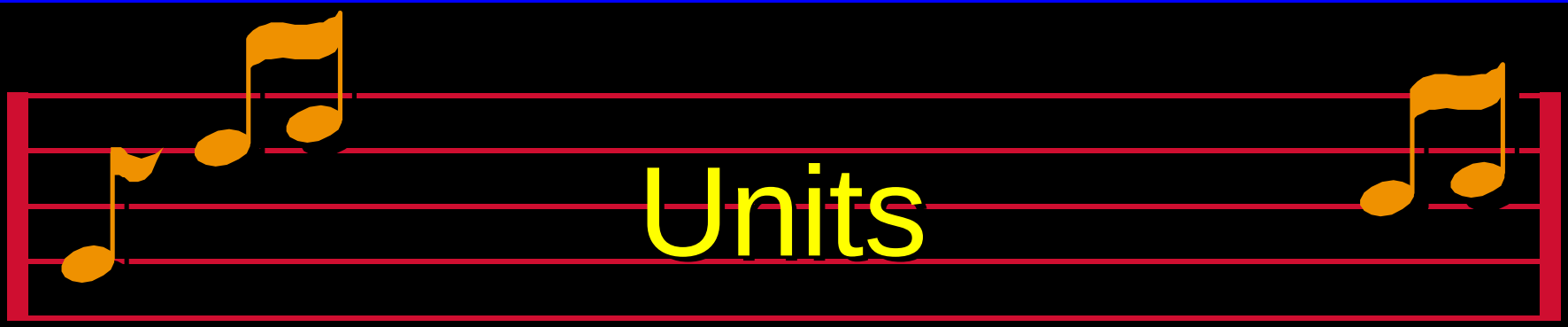
Definitions

- Amplitude
  - The maximum displace-ment (absolute value)



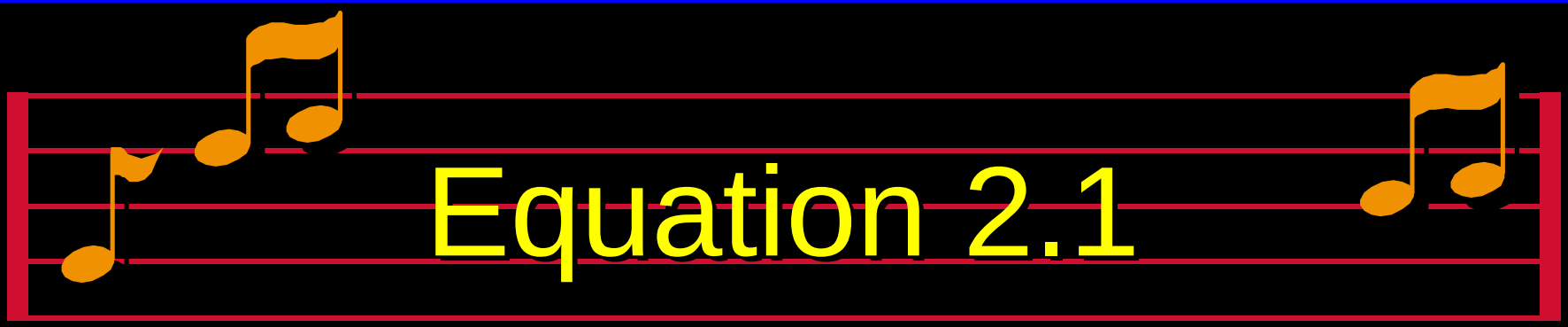
Units

- ***Period*** - Time (Usually seconds)
- ***Frequency*** - Oscillations (or cycles) per second
  - One cycle per second is called one ***Hertz*** (Hz)



Units

- ***Displacement*** - Distance
  - May be cm, m, ft, degrees, etc.
- ***Amplitude*** - Distance
  - May be cm, m, ft, degrees, etc.

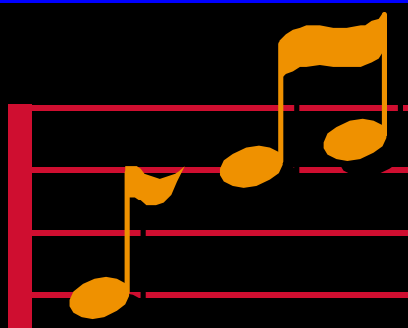


Equation 2.1

$$f = 1/T$$

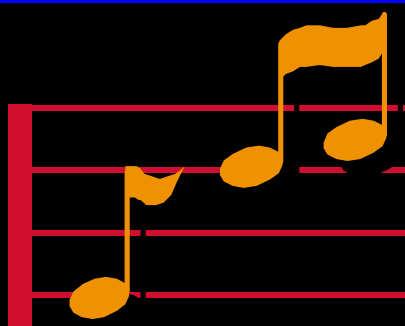
or

$$T = 1/f$$



Experimental Observations

- The frequency is independent of the amplitude
- The greater the inertia factor, the less the frequency
- The greater the stiffness factor, the greater the frequency



Experimental Observations

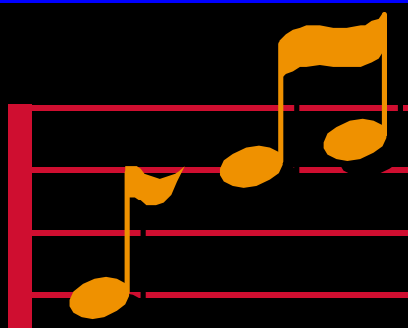
W(N)	T(s)	f(Hz)
0.50	0.142	7.04
1.00	0.200	5.00
2.00	0.284	3.52
4.00	0.40	2.50
8.00	0.568	1.76

Equation 2.2

- Relation between frequency and weight:

Equation 2.3

- Relation between frequency and spring constant:



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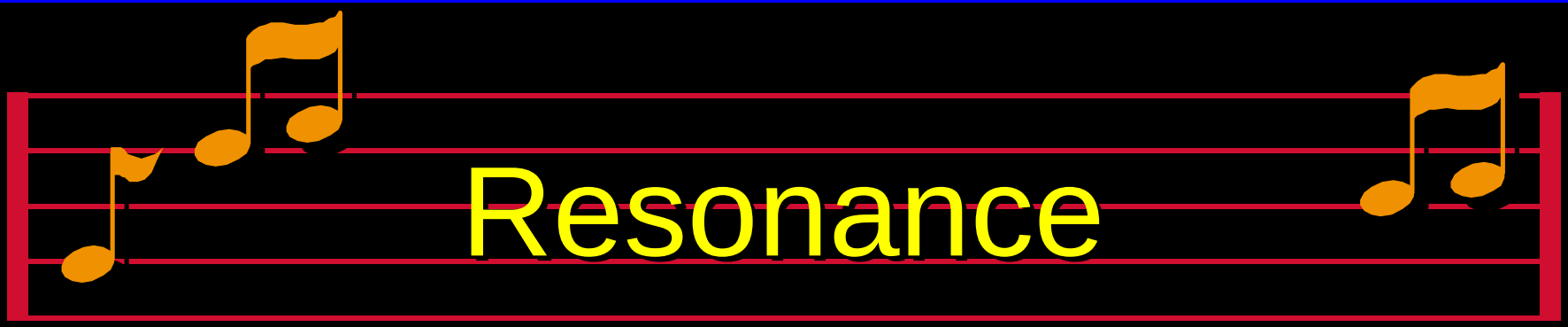
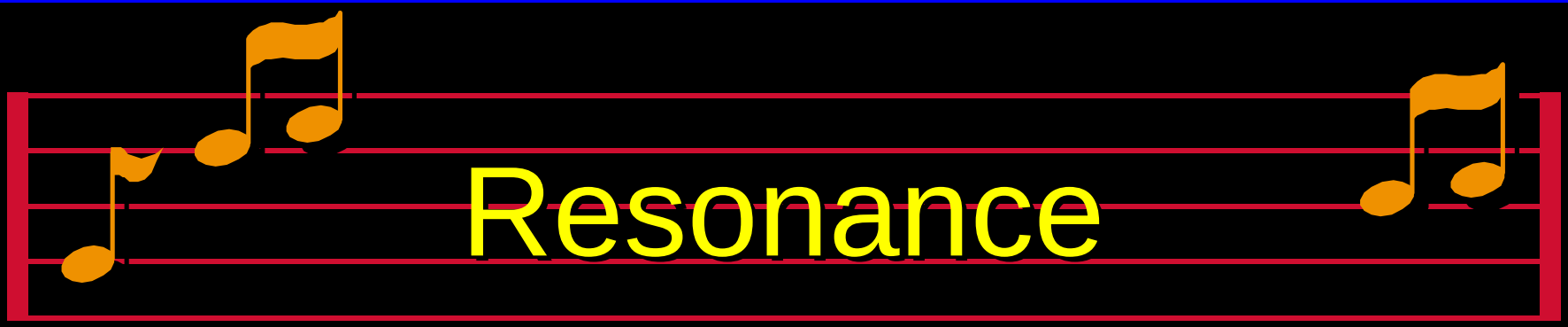


Resonance

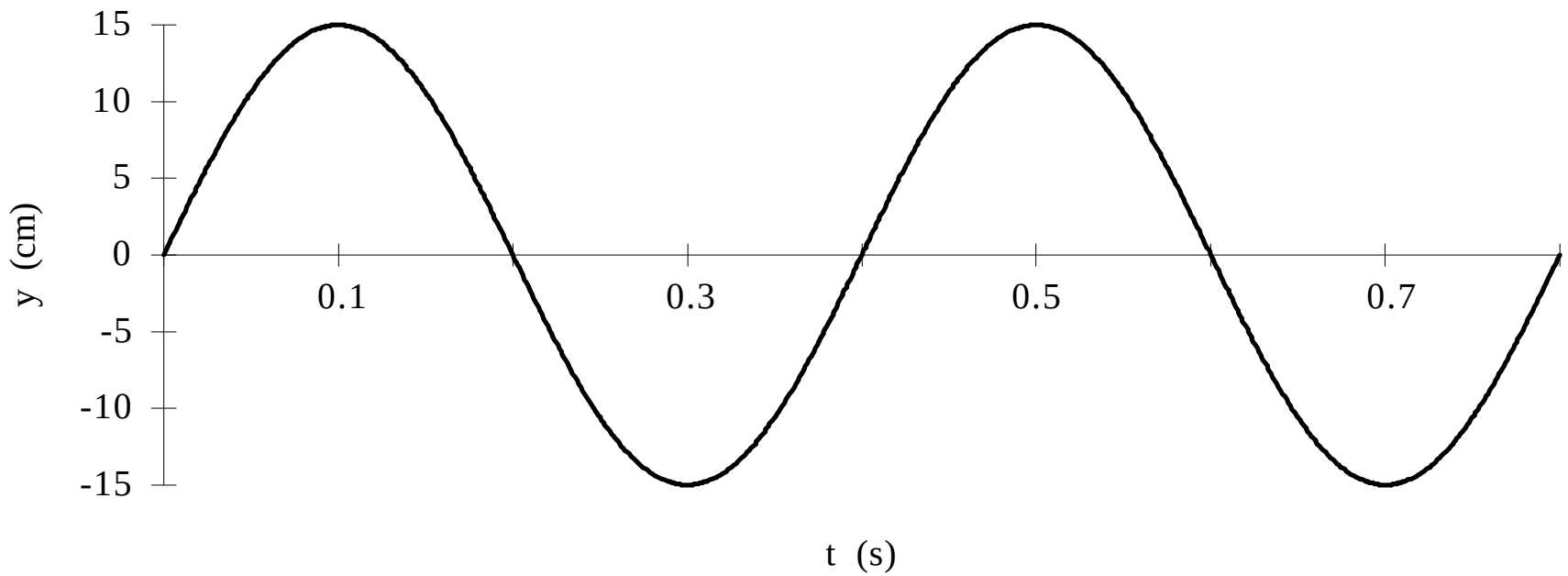
- Occurs whenever an oscillating system is driven at its natural frequency



Resonance

- Under resonant conditions, a system oscillates at its maximum amplitude

Graphing



Phase

- In Phase (0 degrees)
- Out of Phase (180 degrees)
- Measured in degrees