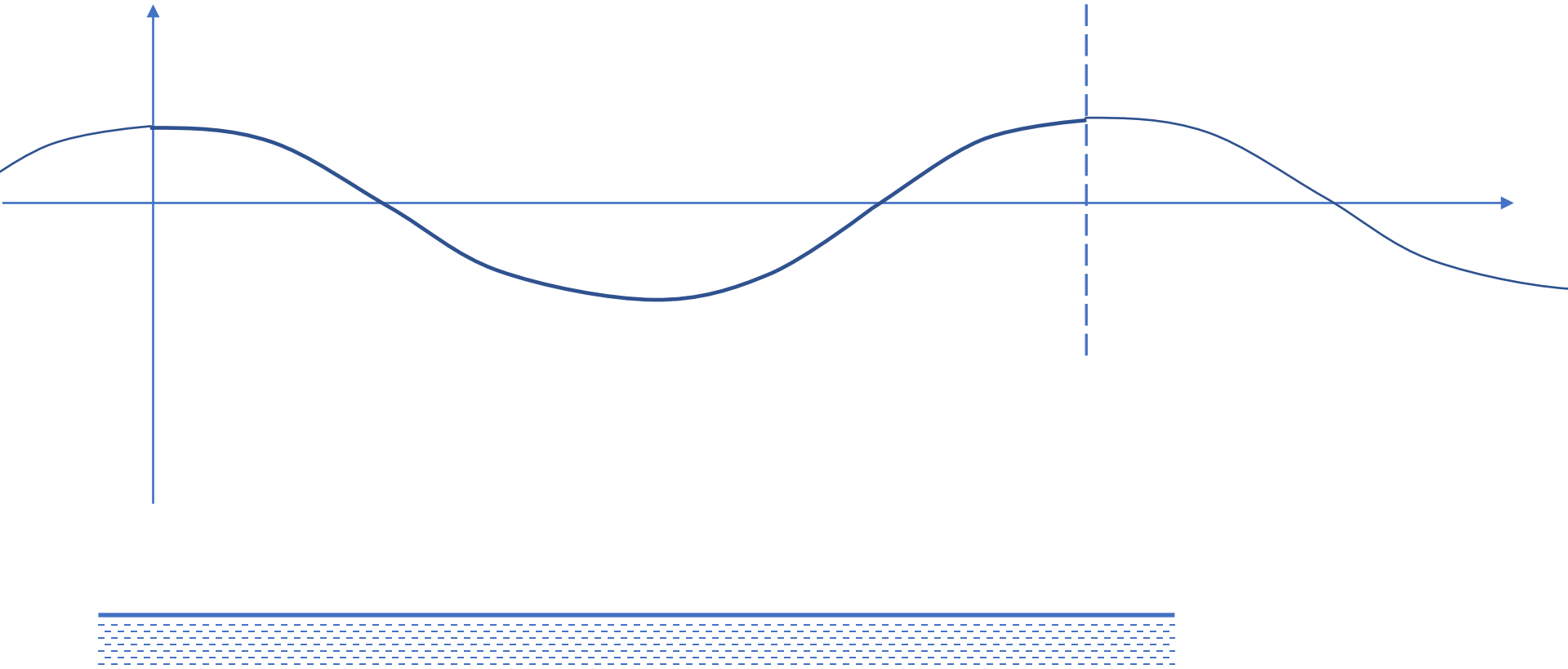
SINUSOIDAL WAVE - DEFINITIONS



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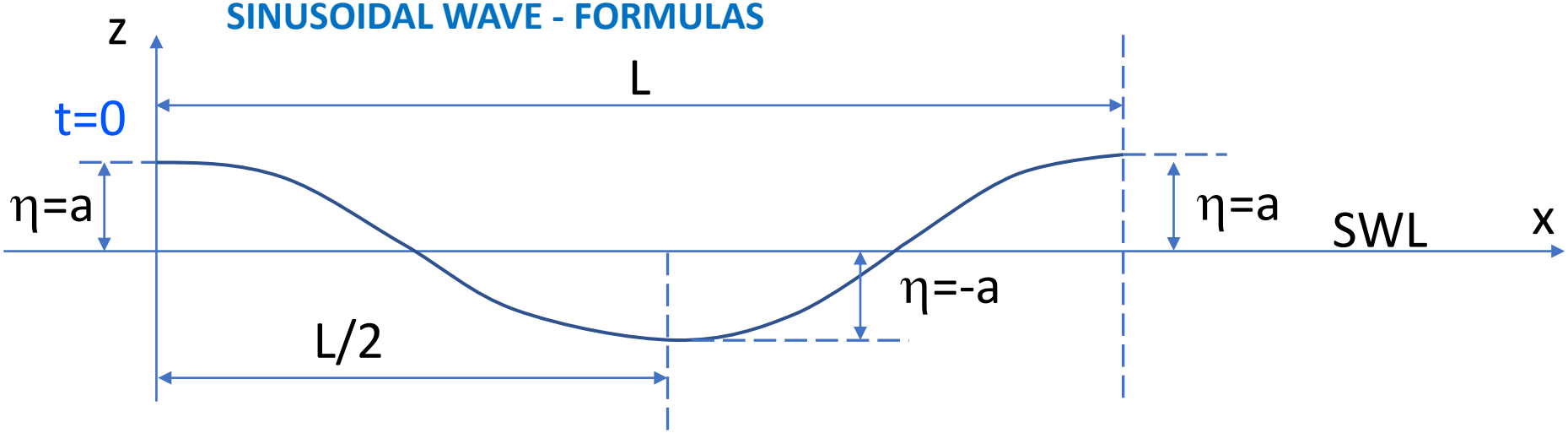
SINUSOIDAL WAVE - FORMULAS



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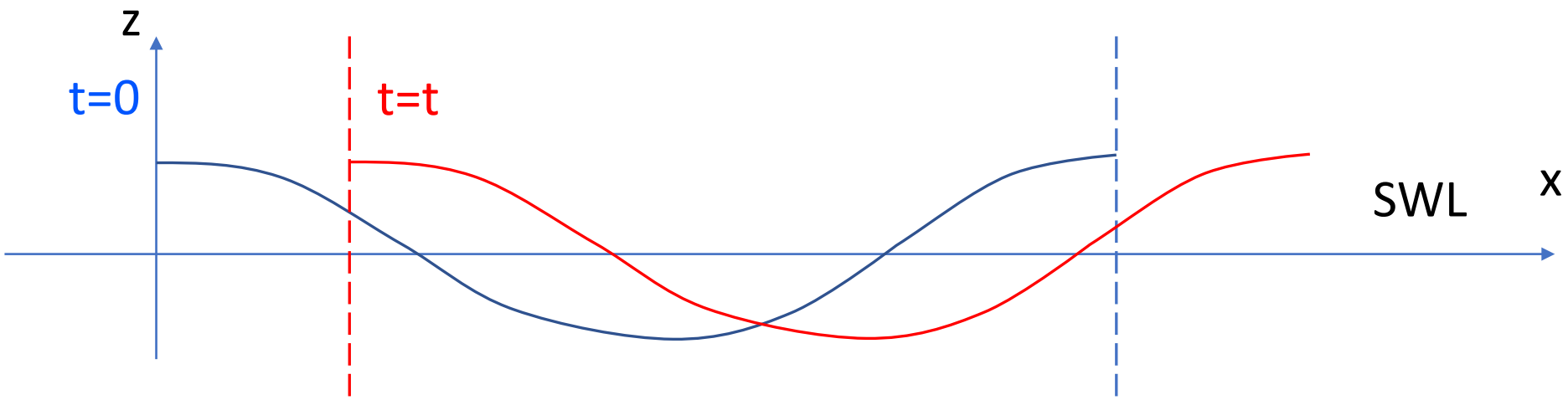
SINUSOIDAL WAVE – GOING TO THE "RIGHT"



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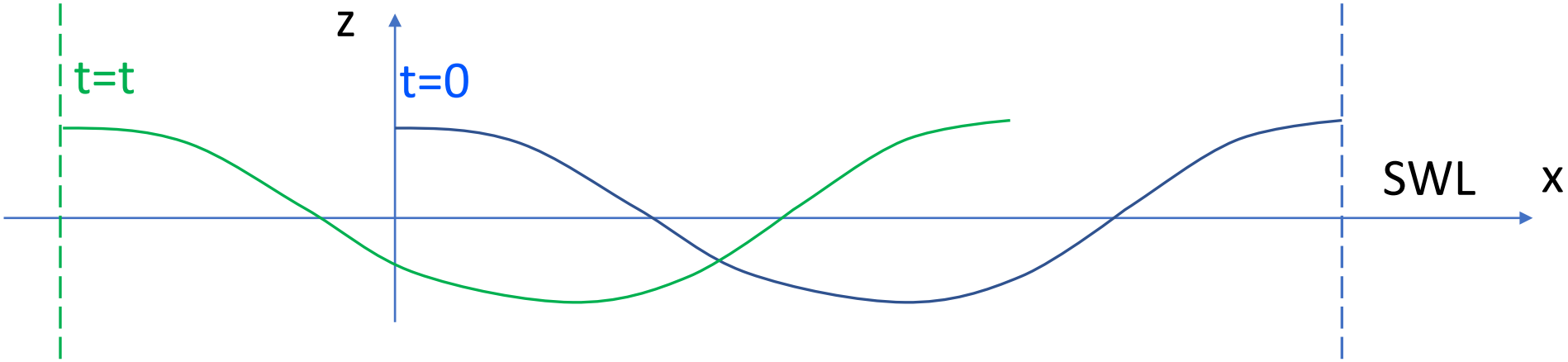

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EXAMPLE PROBLEMS

Find the height, the length, the period, the celerity (=wave speed) of this wave, and in which direction it goes, where η and x are in meters, and t in seconds

$$\eta(x,t) = \cos(x - t)$$

Do the same if: $\eta(x,t) = \cos(x + t)$

What about if: $\eta(x,t) = \cos(t - x)$

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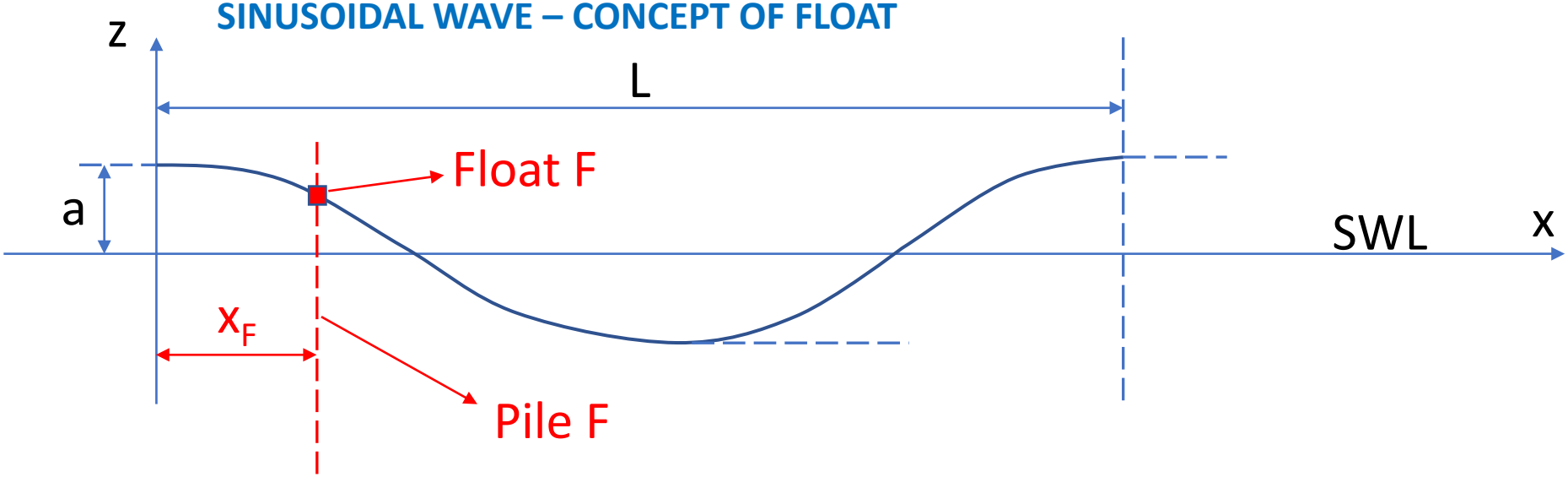
SINUSOIDAL WAVE – CONCEPT OF FLOAT



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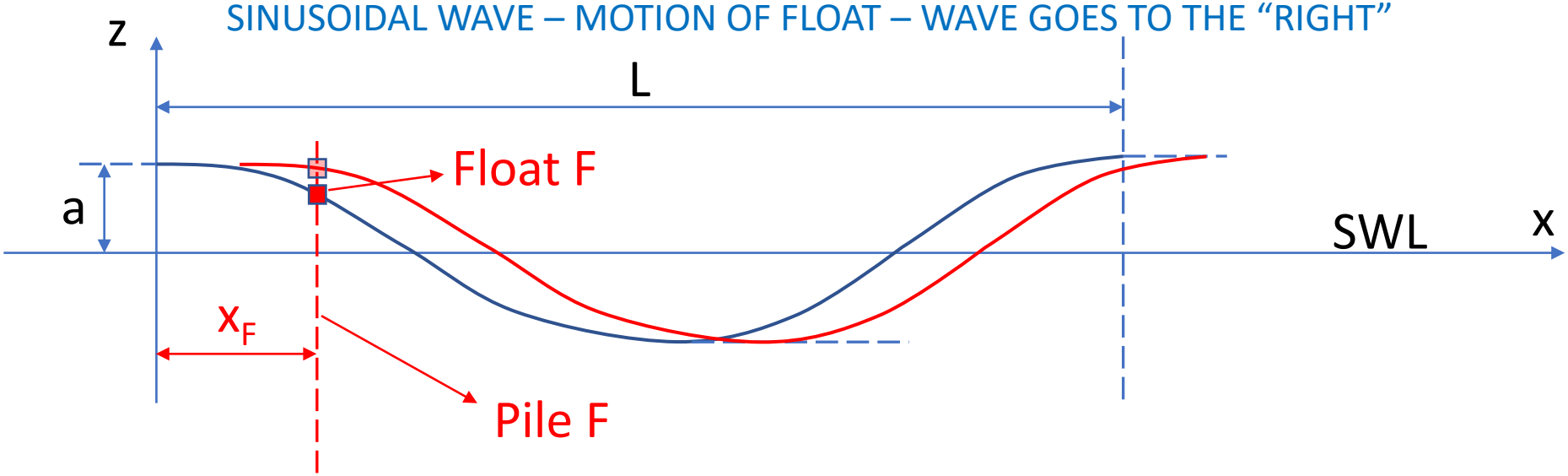
SINUSOIDAL WAVE – MOTION OF FLOAT – WAVE GOES TO THE "RIGHT"



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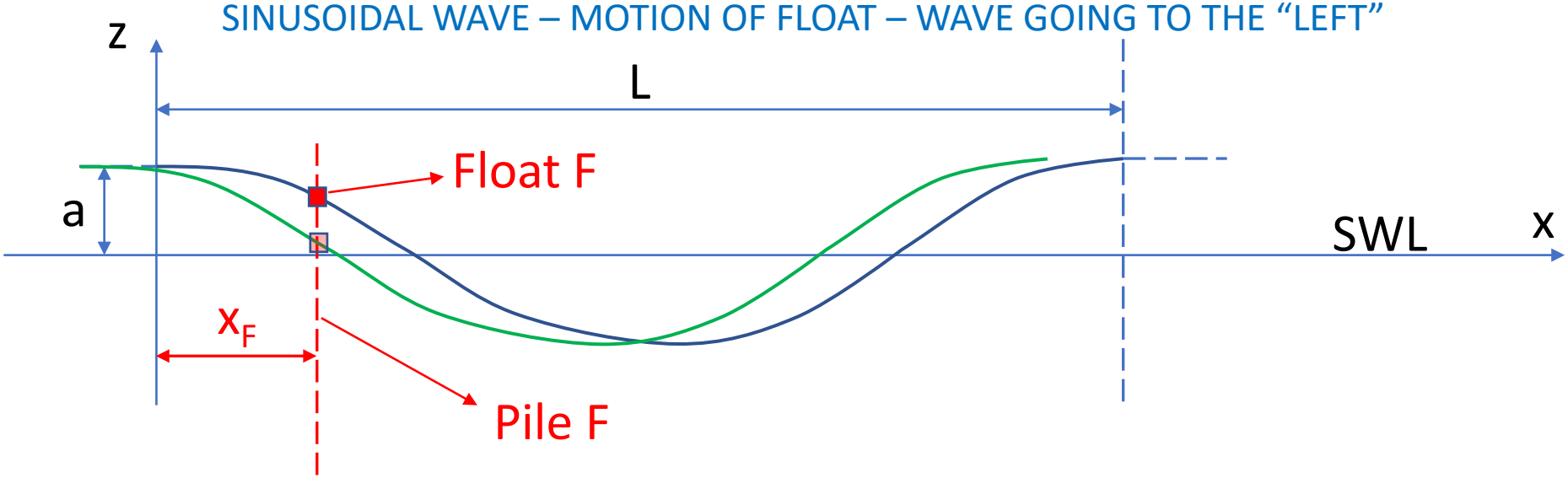
SINUSOIDAL WAVE – MOTION OF FLOAT – WAVE GOING TO THE "LEFT"



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EXAMPLE PROBLEM ON FLOATS

A wave is traveling from pile A to B with a speed $C = 55 ft/sec$ (floats A and B move freely along the piles). The distance between piles A and B is $S = 170$ ft.

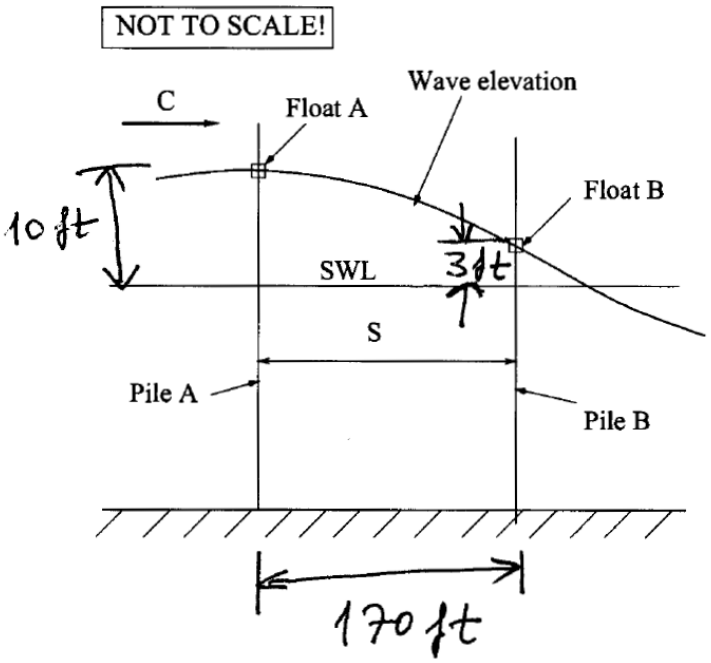
At a particular time we know that float A is at its maximum level (with respect to the Still Water Line, SWL, level), equal to 10 ft. At the same instance float B is 3 ft **over** the SWL level.

2a) Find the height, H, of the wave (5 points)

2b) Find the maximum wave length, L (NOTE: There is a multiplicity of solutions for L from which only the maximum is requested) (25 points)

2c) The period of the wave, T (5 points)

2d) How long after A and B will have the same elevation? What is the value of this elevation? (25 points)



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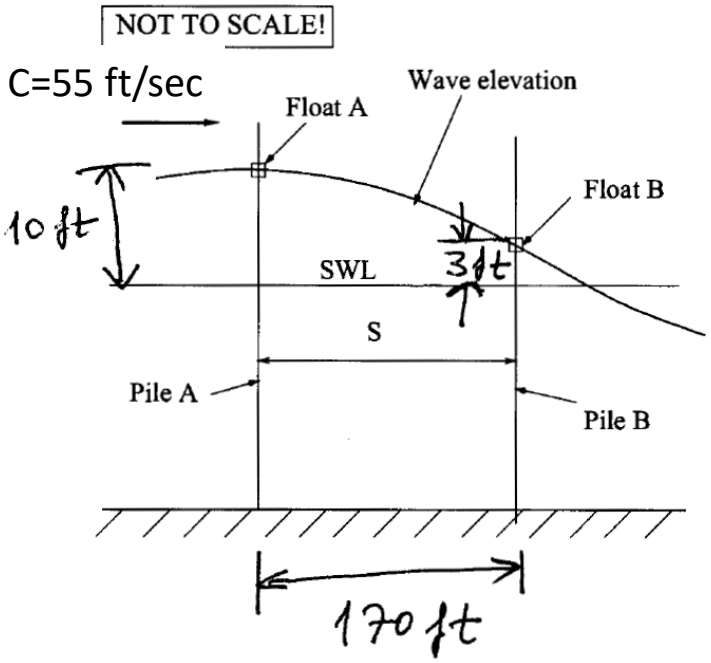
EXAMPLE PROBLEM ON FLOATS

a)H=? b) L=? c) T=? d) t=?



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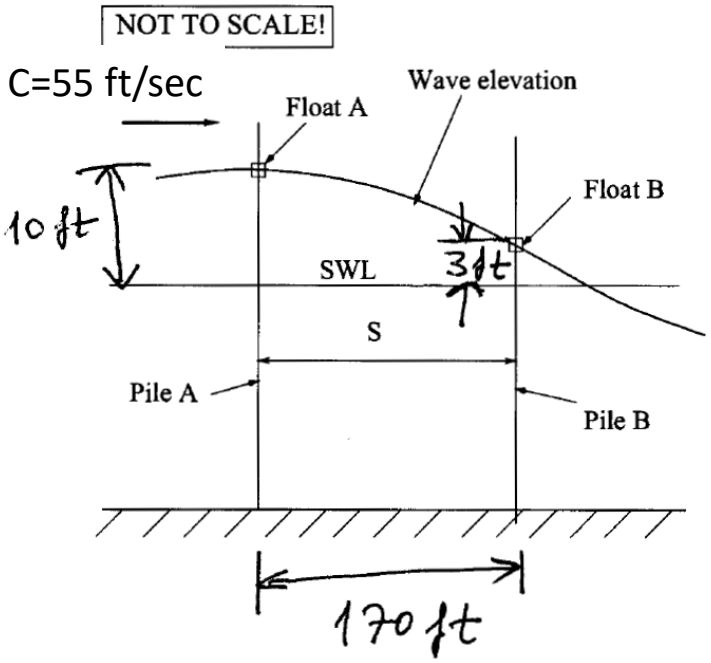

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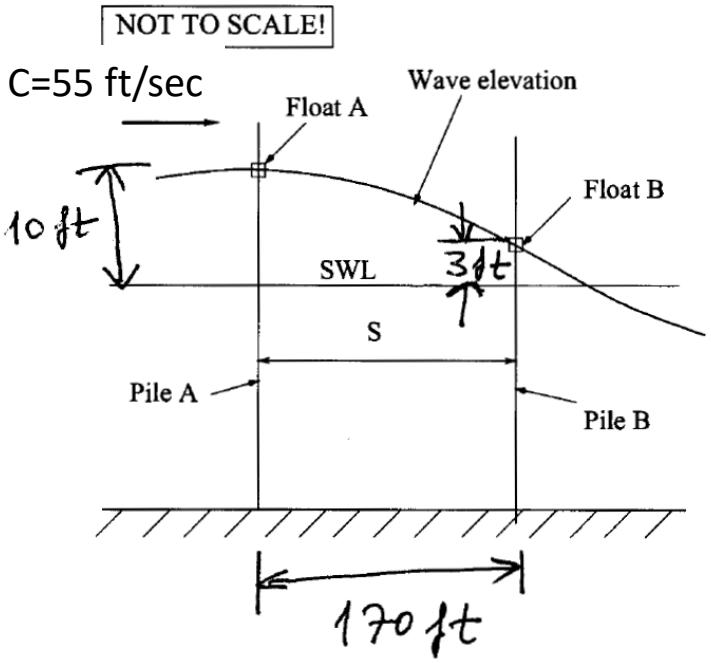

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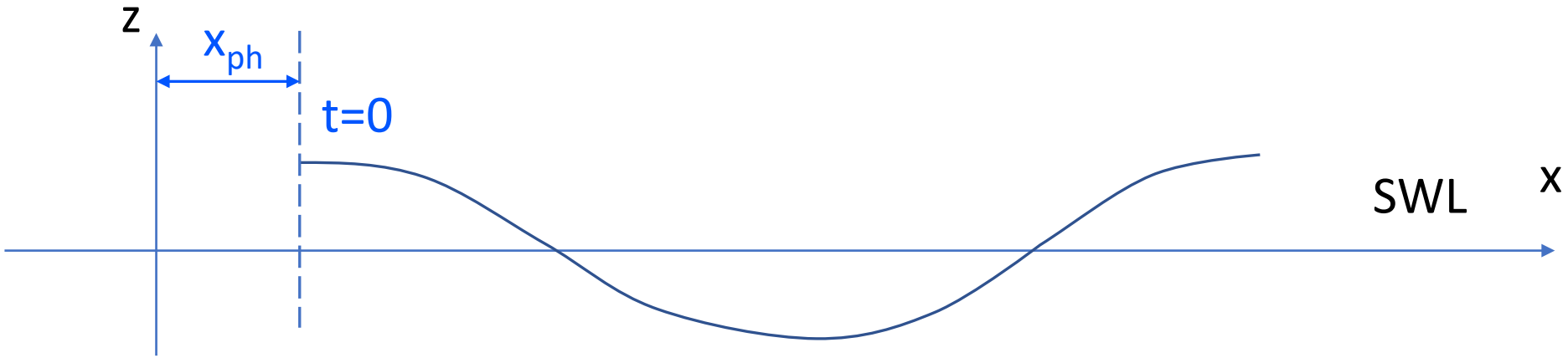
SINUSOIDAL WAVE – PHASE OF A WAVE



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EXAMPLES ON PHASE OF A WAVE

Put the following wave profiles into their "canonical" form and determine their phase and their direction of propagation. Plot the wave profiles at $t = 0$ and verify that the phases you determined *make sense*. Remember a, H, L, k, T, ω, and C, are, by definition, **positive** numbers.

(a) $\eta = \sin(x - 2t)$

(b) $\eta = -\cos(3x + t)$

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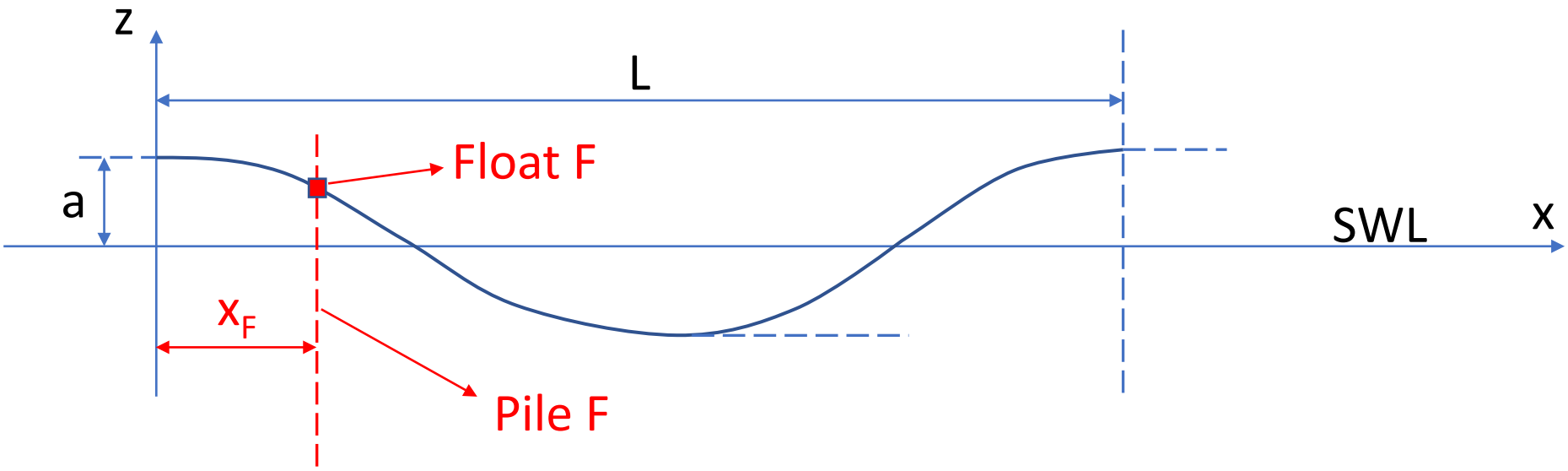
DISPLACEMENT, VELOCITY, AND ACCELERATION OF A FLOAT



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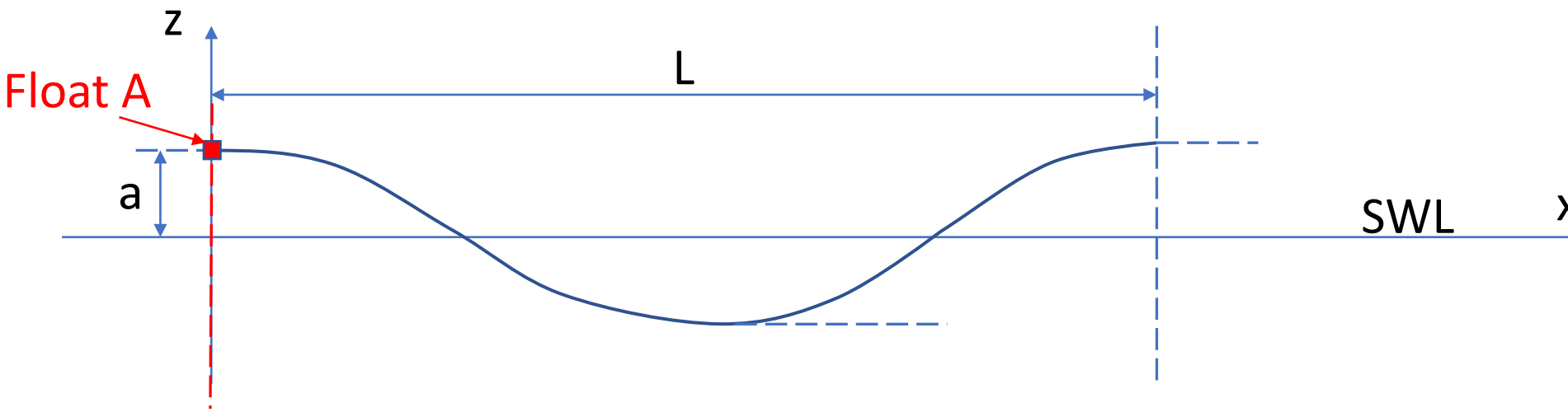
EXAMPLE ON DISPLACEMENT, VELOCITY, AND ACCELERATION OF A FLOAT



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