

```
> restart : with(plots) : assume(v > 0, L > 0) :
> f(x) := piecewise(x < L/4, 4*v*x/L, x < L/2, (4*v/L)*(L/2-x), x < L, 0);
```

$$f := x \mapsto \begin{cases} \frac{4 \cdot v \cdot x}{L} & x < \frac{L}{4} \\ \frac{4 \cdot v \cdot \left(\frac{L}{2} - x\right)}{L} & x < \frac{L}{2} \\ 0 & x < L \end{cases} \quad (1)$$

```
> u(x) := piecewise(0 ≤ x and x ≤ a, A·sin(k[n]·x), a ≤ x and x ≤ L, B·sin(rho·k[n]·(L-x)));
```

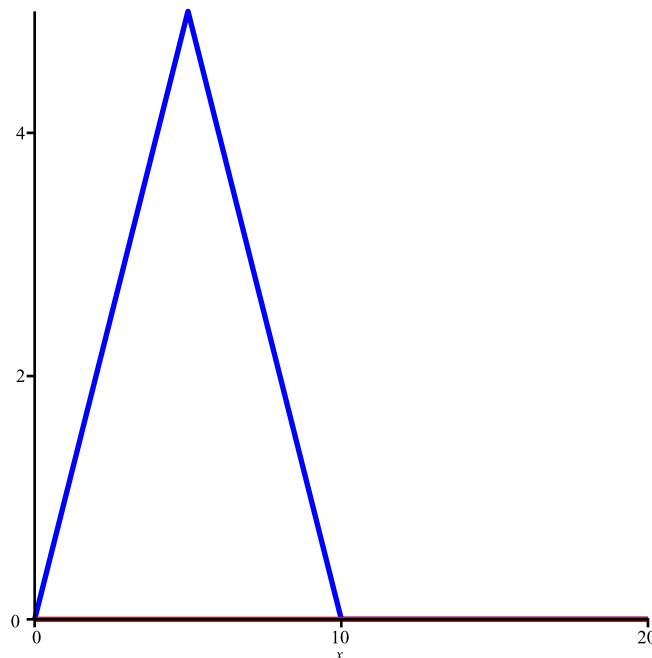
$$u := x \mapsto \begin{cases} A \cdot \sin(k_n \cdot x) & 0 \leq x \leq a \\ B \cdot \sin(\rho \cdot k_n \cdot (L - x)) & a \leq x \leq L \end{cases} \quad (2)$$

```
> a[n] := solve(tan(k[n]·L) + rho·tan(rho·k[n]·L) = 0, k[n]);
Warning, solve may be ignoring assumptions on the input variables.
Error, (in is) invalid input: 2*(NULL)*L = 0
```

```
>
> w(L)
```

$$-B \rho k \quad (3)$$

```
> sol2 := subs( {L=20, v=5, a=10}, sol) : vel := diff(sol2, t) :
> plot( [subs( {L=20, v=5, a=10}, f(x) ), eval(vel, t=0) ], x=0..20, color=[blue, red],
thickness=2, tickmarks=[4, 4]);
```



```
> animate(sol2, x=0..20, t=0..50, frames=50, thickness=2, tickmarks=[4, 3]);
```

