

## Huygen's Principle: Many Sources in a Row -> Plane Wave

Sum up spherical wavefronts from sources arrayed along y-axis. The wave velocity is  $c$ , and the wavefronts have Gaussian shapes. The spacing of the sources is  $dy$ , and they are delayed relative to their neighbor by  $dt$ . Note that the angle made by the wavefront with the y axis is given by  $\sin(\theta) = c dt / dy$ .

```
In[9]:= val = { c → 1, dy → 3, dt → 0.3, width → 0.1};
```

```
In[10]:= wfunc[x_, y_, t_] = Sum[
  e^(-sqrt(x^2 + (y - n dy)^2 - c (t - (n+10) dt))^2 / width) /
  sqrt(x^2 + (y - n dy)^2), {n, -10, 10} + 0.1 + e^-x^2 /. 0.1;
```

Note: The last two terms are to set the background color and draw the y-axis.

```
In[11]:= wplot[t_] := DensityPlot[Evaluate[wfunc[x, y, t] /. val],
  {x, -10, 30}, {y, -20, 20}, PlotRange → {0, 1}, ColorFunction → Hue, PlotPoints → 80];
```

```
In[12]:= Table[wplot[t], {t, 0, 20, 1}];
```

