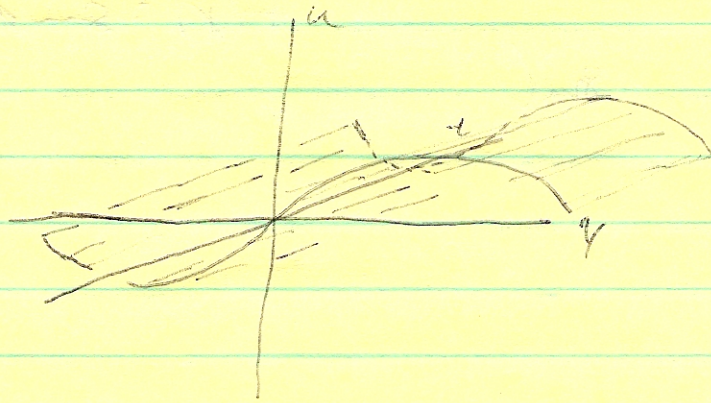
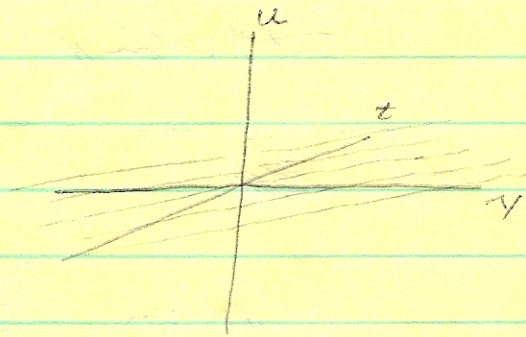
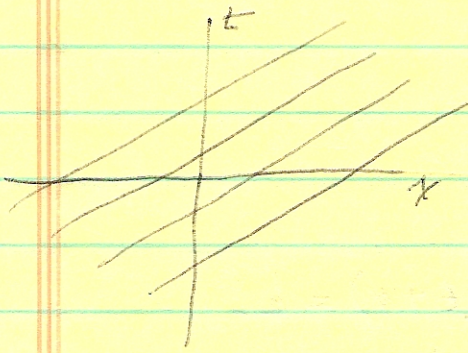


(8)



We know $u(0, x) = \sin x$ so, writing
the characteristic $-\frac{3}{2}t + x = \text{const.}$,
we see that

$$u(t, x) = \sin\left(-\frac{3}{2}t + x\right) \text{ is a solution}$$

(check

$$u_t = -\frac{3}{2} \cos\left(-\frac{3}{2}t + x\right)$$

$$u_x = \cos\left(-\frac{3}{2}t + x\right)$$

so

$$\begin{aligned} 2u_t + 3u_x &= 2\left(-\frac{3}{2}\cos\left(-\frac{3}{2}t + x\right)\right) + 3\cos\left(-\frac{3}{2}t + x\right) \\ &= -3\cos\left(-\frac{3}{2}t + x\right) + 3\cos\left(-\frac{3}{2}t + x\right) \\ &= 0 \end{aligned}$$

$$\text{and } u(0, x) = \sin\left(-\frac{3}{2} \cdot 0 + x\right) = \sin x.$$