Many readers will skim over formulas on their first reading of your exposition. Therefore, your sentences should flow smoothly when all but the simplest formulas are replaced by " $u^{(a)}(t) - \nabla \cdot (a(x) \nabla u) = 0$ bla bla bla bla

(1)
$$\begin{cases} u(x,0) = u_0(x) \text{ bla bla} \\ u(t,\sigma) = 0 & \text{ bla bla bla bla} \end{cases}$$

(2)
$$\left\{ \begin{array}{ccc} u(x,0)=u_0(x) & \mbox{bla bla} \\ u(t,\sigma)=0 & \mbox{bla bla bla bla} \end{array} \right.$$

Many readers will skim over formulas on their first reading of your exposition. Therefore, your sentences should flow smoothly when all but the simplest formulas are replaced by "blah" or some other grunting noise.