$$\mu(t) = e^{\int_{t_0}^{t} p(s)ds}$$

$$\Rightarrow$$

$$e^{\int_{t_0}^{t} p(s)ds} y' - p(t) e^{\int_{t_0}^{t} p(s)ds} y = e^{\int_{t_0}^{t} p(s)ds} g(t)$$

$$\equiv$$

$$[e^{\int_{t_0}^{t} p(s)ds} y]' = e^{\int_{t_0}^{t} p(s)ds} g(t)$$

$$\equiv$$

$$\int_{t_0}^{t} [e^{\int_{t_0}^{s} p(u)du} y]' ds = \int_{t_0}^{t} e^{\int_{t_0}^{s} p(u)du} g(s) ds$$

$$\equiv$$

$$e^{\int_{t_0}^{t} p(u)du} y - e^{\int_{t_0}^{t_0} p(s)ds} y_0 = \int_{t_0}^{t} e^{\int_{t_0}^{s} p(u)du} g(s) ds$$

$$\equiv$$

$$y = e^{-\int_{t_0}^{t} p(s)ds} \left[\int_{t_0}^{t} e^{\int_{t_0}^{s} p(u)du} g(s) ds + y_0 \right]$$