$$(a+bt)\frac{dq}{dt} + \frac{1}{c}q = V$$

$$\frac{dq}{dt} + \frac{1}{Rc}q = \frac{V}{R}$$

$$\mu(t) = e^{\int \frac{1}{Rc}dt} = e^{\int \frac{1}{(a+bt)c}dt}$$

$$= e^{\frac{1}{c}\int \frac{1}{b}\frac{1}{u}du} = e^{\frac{1}{bc}\ln|u|}$$

$$= e^{\frac{1}{bc}\ln|a+bt|}$$

$$= (a+bt)^{\frac{1}{bc}} = (a+bt)^{k}$$

$$\frac{d}{dt}\left((a+bt)^k q\right) = \frac{V}{a+bt}(a+bt)^k$$

$$(a+bt)^k q = V\left(\int \frac{(a+bt)^k}{a+bt}dt\right) + C$$

$q(0) = q_0$

$$a^k q_0 = V\left(\int \frac{a^k}{a}dt\right) + C$$

$$C = a^k q_0 - V\left(\int \frac{a^k}{a}dt\right), \quad \text{so}$$

$$q(t) = \frac{V\left(\int \frac{(a+bt)^{1/bc}}{a+bt}dt\right) + a^{\frac{1}{bc}}q_0 - V\left(\int \frac{a^{1/bc}}{a}dt\right)}{(a+bt)^{1/bc}}$$