$$v(t) = -\frac{g}{k} + \left(\frac{g}{k} + v_0\right) E_\gamma(-(kt)^\gamma) = -\frac{g}{k} + \left(\frac{g}{k} + v_0\right) \sum_{n=0}^{\infty} (-1)^n \frac{(kt)^{n\gamma}}{\Gamma(n\gamma + 1)}.$$