SOLOW GROWTH MODEL

Assumptions
1) Production function $Y = F(K, L)$ is constant return to scale, diminishing MPL and MPK.
2) Constant exogeneous saving rate, constant depreciation rate.
3) Closed Economy $\Rightarrow$ Net Investment = Net Saving

\[
\Delta K = \text{Net Investment} = I - \delta K = s(Y - \delta K)
\]
\[
\frac{\Delta K}{K} = s \left( \frac{Y}{K} - \delta \right)
\]
\[
\frac{\Delta k}{k} + \frac{\Delta L}{L} = s \left( \frac{Y/L}{K/L} - \delta \right)
\]
\[
\frac{\Delta k}{k} = s \left( \frac{y}{k} - \delta \right) - n
\]

Definition Average product of capital $= Y/K$

Definition Steady-state level of capital is the level of $k^*$ such that when $k = k^*$, $\frac{\Delta k}{T} = 0$

Definition Transition path is the path showing the level of accumulated capital over time.

Conditional convergence

\[
\frac{\Delta y}{y} = \frac{g}{1 - \alpha}
\]

The A-K Model

\[
Y = AK
\]

Problem: Assuming that $F(K, L) = (0.5)K^{2/3}L^{1/3}$, $s = 0.2$, $\delta = 0.1$, $n = 0.03$, then:
(a) Show that the production function is constant return to scale.
(b) Argue that it has diminishing marginal return in capital and labor.
(c) Exhibit the growth accounting formula.
(d) Express the production function in the form of per labor: $y = f(k)$
(e) Show the equation exhibiting the growth rate of capital per labor.
(f) Solve for the steady state level of capital per labor.
(g) Illustrate the graphs for the growth rate of capital and transition path of capital per worker. Show the growth rate in the graphs drawn.
(h) What happens if saving rate increases to 0.3?
(z) Repeat item (g) with the information from item (h), graphically explain the effect of a change in saving rate.