THE OBJECTIVE FUNCTION

We define the slack and artificial variables as follows:

$\omega_1(t) \equiv$ A measure of violation of the solvency constraint (4.4) for period t. $\omega_1(t)$ is positive if the social security tax yield in year t is less than $V(t)$.

$s_2(t) \equiv$ A measure of surplus fulfillment of the social adequacy constraint (4.5) for period t.

$\omega_2(t) \equiv$ A measure of violation of the social adequacy constraint (4.5) for period t.

$s_3(t) \equiv$ A measure of surplus fulfillment of the individual equity constraint (4.6) or (4.7) for period t.

$\omega_3(t) \equiv$ A measure of violation of the individual equity constraint (4.6) or (4.7) for period t.

$s_4 \equiv$ A measure of surplus fulfillment of the terminal constraint (4.10).

$\omega_4 \equiv$ A measure of violation of the terminal constraint (4.10).

We next define $c_i(t)$ as a measure of the cost associated with a unit of $\omega_i(t)$ where $i=1, 2, 3$, and $t=1, 2, \ldots, T$. We define c_4 analogously. Our objective function is: Minimize

$$Z = c_4\omega_4 + \sum_{i=1}^{3}\sum_{t=1}^{T} c_i(t)\,\omega_i(t).$$

SUMMARY STATEMENT OF THE PROBLEM

The entire problem can be stated as follows: Minimize

$$Z = c_4\omega_4 + \sum_{i=1}^{3}\sum_{t=1}^{T} c_i(t)\,\omega_i(t)$$

subject to

$$V(t) \geq 0 \quad (t=1 \ldots . T)$$

$$r(t) \geq 0 \quad (t=1 \ldots . T)$$

$$\omega_i(t) \geq 0 \quad (i=1, 2, 3;\ t=1 \ldots . T)$$

$$s_i(t) \geq 0 \quad (i=2, 3;\ t=1 \ldots . T)$$

$$r(t)\Big[\sum_{k=1}^{g} y(t,k)\Big] + \omega_1(t) - V(t) = 0, \quad (t=1 \ldots . T)$$

$$V(t) - s_2(t) + \omega_2(t) = N(t) \quad (t=1 \ldots . T)$$

$$V(t) - \sum_{k=1}^{t}[y(k,g-t+k)\alpha^{t-k}]r(k) - s_3(t) + \omega_3(t) = 0(1,g-t+1)\alpha^t (t=1, 2, \ldots g-1)$$

$$V(t) - \sum_{k=1}^{g}[y(t-g+k,k)\alpha^{g-k}]r(t-g+k) - s_3(t) + \omega_3(t) = 0 (t=g, g+1 \ldots T)$$

$$\sum_{x=1}^{g-1}\sum_{k=o}^{x-1}[y(T-k,x-k)\alpha^{k}]r(T-k) + s_4 - \omega_4 = H$$