This system of equations can be written in matrix form $A\mathbf{y} = \mathbf{rhs}$ as follows:

$$\begin{pmatrix}
2+q(x_1)\Delta x^2 & -1+\frac{p(x_1)}{2}\Delta x & 0 & \cdots & \cdots & \cdots & \cdots & 0 \\
-1-\frac{p(x_2)}{2}\Delta x & 2+q(x_2)\Delta x^2 & -1+\frac{p(x_2)}{2}\Delta x & 0 & \cdots & \cdots & \cdots & 0 \\
0 & -1-\frac{p(x_3)}{2}\Delta x & 2+q(x_3)\Delta x^2 & -1+\frac{p(x_3)}{2}\Delta x & 0 & \cdots & \cdots & 0 \\
0 & 0 & & & & & & \vdots \\
\vdots & \vdots & & & & & & \vdots \\
 & & & & & & & 0 \\
0 & 0 & 0 & \cdots & 0 & -1-\frac{p(x_{N-1})}{2}\Delta x & 2+q(x_{N-1})\Delta x^2 & -1+\frac{p(x_{N-1})}{2}\Delta x \\
0 & \cdots & \cdots & \cdots & \cdots & 0 & -1-\frac{p(x_N)}{2}\Delta x & 2+q(x_N)\Delta x^2
\end{pmatrix}
\begin{pmatrix} y_1 \\ y_2 \\ y_3 \\ y_4 \\ \vdots \\ \vdots \\ y_{N-2} \\ y_{N-1} \\ y_N \end{pmatrix}$$

$$= \begin{pmatrix}
-r(x_1)\Delta x^2 + \left(1+\frac{p(x_1)}{2}\Delta x\right)\alpha \\
-r(x_2)\Delta x^2 \\
-r(x_3)\Delta x^2 \\
\vdots \\
\vdots \\
-r(x_{N-1})\Delta x^2 \\
-r(x_N)\Delta x^2 + \left(1-\frac{p(x_N)}{2}\Delta x\right)\beta
\end{pmatrix}$$

$A$ is an $N \times N$ triadiagonal matrix; $\mathbf{y}$ is the vector of $y$ values that we want to find.
The boundary conditions appear in the first and last rows of $\mathbf{rhs}$.
To solve for $\mathbf{y}$, we can use `A\rhs` in Matlab.