$$\begin{cases} u'' + u = 0, & x \in [0, x_1] \\ u(0) = a \\ u'(x_1) = b \end{cases}$$

$u_{an} = a\cos x + b \sin x$

$u_m'' + u_m \sim c_{-1}^m u_{m-1} + c_0^m u_m + c_1^m u_m$

$u_N' \sim \bar{c}_{-1} u_{N-1} + \bar{c}_0 u_N$

$Du = f$

$$\begin{pmatrix} 1 & 0 & 0 & 0 & 0 & \cdots & 0 \\ 0 & 0 & 0 & 0 & 0 & \cdots & 0 \;\; \bar{c}_{-1} \;\; \bar{c}_0 \\ c_{-1}^2 & c_0^2 & c_1^2 & 0 & 0 & \cdots & 0 \\ 0 & c_{-1}^3 & c_0^3 & c_1^3 & 0 & \cdots & 0 \\ & & \ddots & & & & \\ 0 & \cdots & c_{-1}^m & c_0^m & c_1^m & 0 \cdots & 0 \\ & & & \ddots & & & \\ 0 & \cdots & 0 & c_{-1}^{N-1} & c_0^{N-1} & c_1^{N-1} & 0 \\ 0 & \cdots & 0 & 0 & c_{-1}^N & c_0^N & c_1^N \end{pmatrix} \begin{pmatrix} u_1 \\ u_2 \\ \vdots \\ u_m \\ \vdots \\ u_{N-1} \\ u_N \end{pmatrix} = \begin{pmatrix} a \\ b \\ 0 \\ \vdots \\ 0 \end{pmatrix}$$