Erratum to the paper:

Fast structured direct spectral methods for differential equations with variable coefficients, I. The one-dimensional case

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1. In Eq.(2.14), the "$2(N+1)$ should be "$2N$ in the last column of the matrix. Also, in Eq.(2.15), the "$N+1$" should be N.

$$(2.14)\qquad \begin{pmatrix} 0 & 1 & 0 & 3 & 0 & 5 & \cdots & 0 \\ & 0 & 4 & 0 & 8 & 0 & \cdots & 2N \\ & & 0 & 6 & 0 & 10 & \cdots & 0 \\ & & & 0 & 8 & 0 & \cdots & 2N \\ & & & & 0 & 10 & \ddots & 0 \\ & & & & & \ddots & \ddots & \vdots \\ & & & & & & \ddots & 2N \\ & & & & & & & 0 \end{pmatrix}_{(N+1)\times(N+1)}.$$

$$(2.15)\qquad A_2|_{j,j+1:N} = \begin{cases} (1,0,3,0,5,\ldots,0), & j=1, \\ 2(j,0,j+2,0,j+4,\ldots,0), & j>1,\ j\text{: odd}, \\ 2(j,0,j+2,0,\ldots,N), & j>1,\ j\text{: even}. \end{cases}$$

2. In Eq.(2.17), the $\tilde{F}$ and $\tilde{F}^*$ should be interchanged to make it consistent with the definition of Forward and Backward discrete Chebyshev transforms (*FDCT* and *BDCT*).

   The transforms between the spectral space $\tilde{\mathbf{u}}$ and the physical space $\mathbf{u} = (u(x_j))_{j=0}^N$ can be performed by

$$(2.17)\qquad \tilde{\mathbf{u}} = \tilde{F}\mathbf{u}, \quad \mathbf{u} = \tilde{F}^*\tilde{\mathbf{u}},$$

   where $\tilde{F}$ and $\tilde{F}^*$ are the FDCT and BDCT matrices, respectively.

   Also, the Eq.(2.18) should be

$$(2.18)\qquad A\bar{\mathbf{u}} = \hat{\mathbf{f}}, \quad A = A_3(\tilde{F}\mathcal{D}_{\boldsymbol{\alpha}}\tilde{F}^* - A_2\tilde{F}\mathcal{D}_{\boldsymbol{\beta}}\tilde{F}^*A_2)A_1.$$