Algorithm 3 ChebychevCoefficients for $f(\pm\hat{A}\,dt) = e^{\pm i\hat{A}\,dt}$.

Input: spectral radius Δ of $\hat{A}$; minimum eigenvalue $E_{\min}$ of $\hat{A}$; time step dt

Output: Array of Chebychev coefficients $[a_0 \ldots a_n]$ allowing to approximate $f(\hat{A}\,dt)$ to pre-defined precision.

1: **procedure** ExpChebyCoeffs(Δ, $E_{\min}$, dt)
2: $\alpha = \frac{1}{2}\Delta\,dt$
3: $a_0 = J_0(\alpha)$ ▷ 0'th order Bessel-function of first kind
4: **for** $i = 1 : n_{\max} \approx 4\lfloor\alpha\rfloor$ **do**
5: $a_i = 2J_i(\alpha)$ ▷ i'th order Bessel-function of first kind
6: **if** $|a_i| <$ limit **then** exit loop with $n = i$
7: **end for**
8: **return** $[a_0, \ldots a_n]$
9: **end procedure**