DLN 2.4.6

We wish to compute $\vec{y}^{\,4}$. Since we know 4 previous values, we use Adam's method with $N = 3$. Then predictor formula becomes

$$\vec{y}^{\,n+1} = \vec{y}^{\,n} + h \sum_{k=0}^{3} \tilde{b}_k^{\,3} \vec{f}^{\,n-k} \quad \overset{n=3}{\Rightarrow} \quad \vec{y}^{\,4} = \vec{y}^{\,3} + h \sum_{k=0}^{3} \tilde{b}_k^{\,3} \vec{f}^{\,3-k} \quad \text{or}$$

$$\vec{y}^{\,4} = \vec{y}^{\,3} + h\left[\tilde{b}_0^{\,3} \vec{f}^{\,3} + \tilde{b}_1^{\,3} \vec{f}^{\,2} + \tilde{b}_2^{\,3} \vec{f}^{\,1} + \tilde{b}_3^{\,3} \vec{f}^{\,0} \right] \quad \text{or}$$

$$\boxed{\vec{y}^{\,4} = \vec{y}^{\,3} + \frac{1}{3}\left[\frac{55}{24} \vec{f}^{\,3} - \frac{59}{24} \vec{f}^{\,2} + \frac{37}{24} \vec{f}^{\,1} - \frac{9}{24} \vec{f}^{\,0} \right] \quad \text{predictor}}$$

Put in the numbers:

$$\vec{y}^{\,4} = \begin{pmatrix} 1.15853 \\ \\ 1.45970 \end{pmatrix} + \frac{1}{3}\left[\frac{55}{24} \begin{pmatrix} 1.45970 \\ \\ .84147 \end{pmatrix} - \frac{59}{24} \begin{pmatrix} 1.21412 \\ \\ .61837 \end{pmatrix} + \frac{37}{24} \begin{pmatrix} 1.05505 \\ \\ .32719 \end{pmatrix} - \frac{9}{24} \begin{pmatrix} 1 \\ \\ 0 \end{pmatrix} \right] \quad \text{or}$$

$$\boxed{\vec{y}^{\,4} = \begin{pmatrix} 1.695853 \\ \\ 1.763909 \end{pmatrix} \quad \text{predictor result}}$$