We are concerned with numerical solutions of the initial-value problem of ordinary differential equations (ODEs):

\[ \frac{dy}{dx} = f(x, y) \quad (a \leq x \leq b), \quad y(a) = y_I. \]

In the talk, we will propose a new class of linear multistep methods which has a potential of wide applications. The basic idea is as follows. Suppose we are now at a certain step-point \( x \) and an approximation \( y_0 \) to \( y(x) \) is available. With the constant stepsize \( h \), usually we try to obtain the approximation \( y_1 \) of the next step-point \( x + h \). Here, introducing a scheme for \( y_2 \) at \( x + 2h \) by employing \( y_0 \) and \( y_1 \), we compute it. The value \( y_2 \) stands for a “look-ahead”. Then, by another scheme incorporating \( y_0, y_1 \) and \( y_2 \), we correct the value \( y_1 \).

These methods were proposed in the 80ies, but, as a matter of fact, ancestors can be found in the literature before. We will try to survey the preceding works and to study the methods both theoretically and practically.