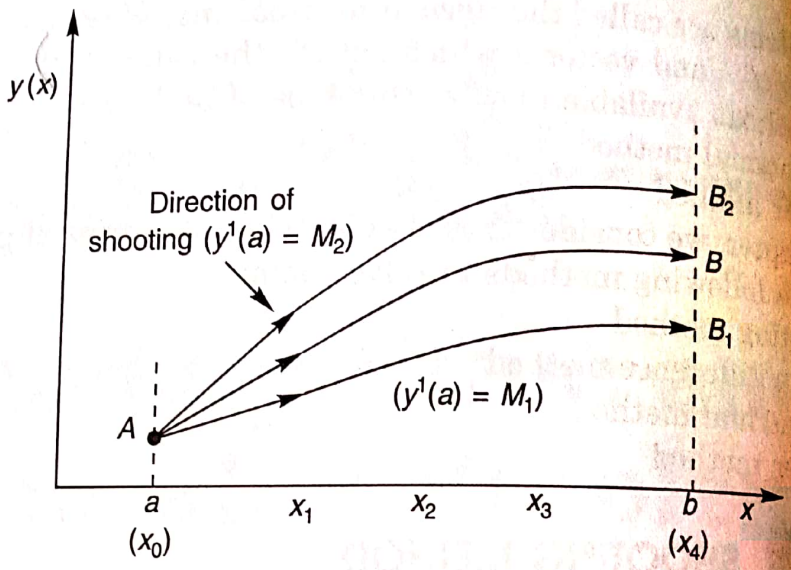

Fig. 14.1 Illustration of shooting method

Let us assume that $z(a) = M_3$ leads to the value $y(b) = B$. If we assume that the values of M and B are linearly related, then

$$\frac{M_3 - M_2}{B - B_2} = \frac{M_2 - M_1}{B_2 - B_1}$$

Then

$$M_3 = M_2 + \frac{B - B_2}{B_2 - B_1} \times (M_2 - M_1)$$

$$= M_2 - \frac{B_2 - B}{B_2 - B_1} \times (M_2 - M_1) \qquad (14.4)$$

Now with $z(a) = M_3$, we can again obtain the solution of $y(x)$.

Example 14.1

Using shooting method, solve the equation

$$\frac{d^2y}{dx^2} = 6x, \qquad y(1) = 2, \qquad y(2) = 9$$

in the interval (1,2)

By transformation we obtain the following:

$$\frac{dy}{dx} = z \qquad y(1) = 2$$

$$\frac{dz}{dx} = 6x$$

Let us assume that $z(1) = y'(1) = 2(M_1)$. Applying Heun's method, we obtain the solution as follows: