```
M[x_] := 1 + β[x] A;
b2[x_] := b[x] + D[g[t + h x], t] + A g[t + h x];
β[0] := -μ h; β[1] := (1 - μ) h;

Series[M[1] g[t + h] - M[0] g[t] +
   β[1] b[1] - β[0] b[0] - (β[1] b2[1] - β[0] b2[0]), {h, 0, 3}]
```

$$\left(-\frac{1}{2}\, g''[t] + \mu\, g''[t]\right) h^2 + \left(-\frac{1}{3}\, g^{(3)}[t] + \frac{1}{2}\, \mu\, g^{(3)}[t]\right) h^3 + O[h]^4$$

```
Simplify[β[1] A g - β[0] A g]
```

A g h