Equations and operator $\widehat{A}$:

$E_3[u] = u_{xxxx} + 10uu_x + 5u_x^2 + 10u^3 - A_3u + B_3$

$E_4[u] = u_{xxxxxx} + 14uu_{xxxx} + 28u_xu_{xxx} + 21u_{xx}^2 + 70u^2u_{xx} + 70uu_x^2 + 35u^4 - A_4u + B_4$

$E_4[u] = \widehat{A}E_3[u]$

$\widehat{A} = \frac{\partial^2}{\partial x^2} + 4u - 2\int u_x < . > dx + \widehat{B}$

1. $E_4[u] - \frac{\partial^2}{\partial x^2}E_3[u] = A3u''(x) - A4u(x) + B4 + 4u^{(4)}(x)u(x) + 40u(x)^2u''(x) + u''(x)^2 + 10u(x)u'(x)^2 - 2u^{(3)}(x)u'(x) + 35u(x)^4$

2. $E_4[u] - \left\{\frac{\partial^2}{\partial x^2} + 4u\right\}E_3[u] = A3u''(x) + 4A3u(x)^2 - A4u(x) - 4B3u(x) + B4 + u''(x)^2 - 10u(x)u'(x)^2 - 2u^{(3)}(x)u'(x) - 5u(x)^4$

3. $E_4[u] - \left\{\frac{\partial^2}{\partial x^2} + 4u - 2\int u_x < . > dx\right\}E_3[u] = A3u''(x) + 3A3u(x)^2 - A4u(x) - 2B3u(x) + B4$

4. $E_4[u] - \left\{\frac{\partial^2}{\partial x^2} + 4u - 2\int u_x < . > dx\right\}E_3[u] - A3E_2[u] = A2A3u(x) - A3B2 - A4u(x) - 2B3u(x) + B4 = u(x)(A2A3 - A4 - 2B3) - A3B2 + B4$

$\widehat{B}E_3[u] = A3u''(x) + 3A3u(x)^2 - A4u(x) - 2B3u(x) + B4$

$\widehat{B}(u_{xxxx} + 10uu_x + 5u_x^2 + 10u^3 - A_3u + B_3) = A3u''(x) + 3A3u(x)^2 - A4u(x) - 2B3u(x) + B4$

$E_{n+1}[u] = \widehat{A}E_n[u] + A_nE_2[u] + p_n + q_nu(x)$

$\widehat{A} = \frac{\partial^2}{\partial x^2} + 4u - 2\int u_x < . > dx$

$p_n + q_nu(x)$:(n =)

2. $u(x)\left(A2^2 - A3 - 2B2\right) - A2B2 + B3$

3. $u(x)(A2A3 - A4 - 2B3) - A3B2 + B4$

4. $u(x)(A2A4 - A5 - 2B4) - A4B2 + B5$

5. $u(x)(A2A5 - A6 - 2B5) - A5B2 + B6$

6. $u(x)(A2A6 - A7 - 2B6) - A6B2 + B7$