Appendix A

$$a_{11} = M[\frac{1}{4}\alpha_1^2(J_{n-2}(\alpha_1 a'h) - 2J_n(\alpha_1 a'h) + J_{n+2}(\alpha_1 a'h)) - (\frac{n}{a'h})^2 J_n(\alpha_1 a'h)] - \frac{KS}{hT}QJ_n(\alpha_1 a'h) -$$
$$R\frac{G}{MT}[\frac{1}{4}\alpha_1^2(J_{n-2}(\alpha_1 a'h) - 2J_n(\alpha_1 a'h) + J_{n+2}(\alpha_1 a'h)) + \frac{1}{2a'h}\alpha_1(J_{n-1}(\alpha_1 a'h) - J_{n+1}(\alpha_1 a'h)) - (\frac{n}{a'h})^2 J_n(\alpha_1 a'h)$$
$$-K^2 J_n(\alpha_1 a'h)]$$

$$a_{12} = M[\frac{1}{4}\alpha_2^2(J_{n-2}(\alpha_2 a'h) - 2J_n(\alpha_2 a'h) + J_{n+2}(\alpha_2 a'h)) - (\frac{n}{a'h})^2 J_n(\alpha_2 a'h)] - \frac{KS}{hT}QJ_n(\alpha_2 a'h) -$$
$$R\frac{G}{MT}[\frac{1}{4}\alpha_2^2(J_{n-2}(\alpha_2 a'h) - 2J_n(\alpha_2 a'h) + J_{n+2}(\alpha_2 a'h)) + \frac{1}{2a'h}\alpha_2(J_{n-1}(\alpha_2 a'h) - J_{n+1}(\alpha_2 a'h)) - (\frac{n}{a'h})^2 J_n(\alpha_2 a'h)$$
$$-K^2 J_n(\alpha_2 a'h)]$$

$$a_{13} = M[\frac{1}{4}\alpha_3^2(J_{n-2}(\alpha_3 a'h) - 2J_n(\alpha_3 a'h) + J_{n+2}(\alpha_3 a'h)) - (\frac{n}{a'h})^2 J_n(\alpha_3 a'h)] - \frac{KS}{hT}QJ_n(\alpha_3 a'h) -$$
$$R\frac{G}{MT}[\frac{1}{4}\alpha_3^2(J_{n-2}(\alpha_3 a'h) - 2J_n(\alpha_3 a'h) + J_{n+2}(\alpha_3 a'h)) + \frac{1}{2a'h}\alpha_3(J_{n-1}(\alpha_3 a'h) - J_{n+1}(\alpha_3 a'h)) - (\frac{n}{a'h})^2 J_n(\alpha_3 a'h)$$
$$-K^2 J_n(\alpha_3 a'h)]$$
$$a_{14} = 0$$

$$a_{15} = M[\frac{1}{4}\alpha_1^2(Y_{n-2}(\alpha_1 a'h) - 2Y_n(\alpha_1 a'h) + Y_{n+2}(\alpha_1 a'h)) - (\frac{n}{a'h})^2 Y_n(\alpha_1 a'h)] - \frac{KS}{hT}QY_n(\alpha_1 a'h) -$$
$$R\frac{G}{MT}[\frac{1}{4}\alpha_1^2(Y_{n-2}(\alpha_1 a'h) - 2J_n(\alpha_1 a'h) + Y_{n+2}(\alpha_1 a'h)) + \frac{1}{2a'h}\alpha_1(Y_{n-1}(\alpha_1 a'h) - Y_{n+1}(\alpha_1 a'h)) - (\frac{n}{a'h})^2 Y_n(\alpha_1 a'h)$$
$$-K^2 Y_n(\alpha_1 a'h)]$$

$$a_{16} = M[\frac{1}{4}\alpha_2^2(Y_{n-2}(\alpha_2 a'h) - 2Y_n(\alpha_2 a'h) + Y_{n+2}(\alpha_2 a'h)) - (\frac{n}{a'h})^2 Y_n(\alpha_2 a'h)] - \frac{KS}{hT}QY_n(\alpha_2 a'h) -$$
$$R\frac{G}{MT}[\frac{1}{4}\alpha_2^2(Y_{n-2}(\alpha_2 a'h) - 2Y_n(\alpha_2 a'h) + Y_{n+2}(\alpha_2 a'h)) + \frac{1}{2a'h}\alpha_2(Y_{n-1}(\alpha_2 a'h) - Y_{n+1}(\alpha_2 a'h)) - (\frac{n}{a'h})^2 Y_n(\alpha_2 a'h)$$
$$-K^2 Y_n(\alpha_2 a'h)]$$

$$a_{17} = M[\frac{1}{4}\alpha_3^2(Y_{n-2}(\alpha_3 a'h) - 2Y_n(\alpha_3 a'h) + Y_{n+2}(\alpha_3 a'h)) - (\frac{n}{a'h})^2 Y_n(\alpha_3 a'h)] - \frac{KS}{hT}QY_n(\alpha_3 a'h) -$$
$$R\frac{G}{MT}[\frac{1}{4}\alpha_3^2(Y_{n-2}(\alpha_3 a'h) - 2Y_n(\alpha_3 a'h) + Y_{n+2}(\alpha_3 a'h)) + \frac{1}{2a'h}\alpha_3(Y_{n-1}(\alpha_3 a'h) - Y_{n+1}(\alpha_3 a'h)) - (\frac{n}{a'h})^2 Y_n(\alpha_3 a'h)$$
$$-K^2 Y_n(\alpha_3 a'h)]$$
$$a_{18} = 0$$

$$a_{21} = \frac{c_{11}\alpha_1^2}{4}(J_{n-2}(\alpha_1 a'h) - 2J_n(\alpha_1 a'h) + J_{n+2}(\alpha_1 a'h)) + c_{12}(\frac{1}{2a'h}\alpha_1(J_{n-1}(\alpha_1 a'h) - J_{n+1}(\alpha_1 a'h)) -$$
$$-(\frac{n}{a'h})^2 J_n(\alpha_1 a'h)) - c_{13}\frac{KS}{T}J_n(\alpha_1 a'h) - \frac{MG}{4MT}\alpha_1^2(J_{n-2}(\alpha_1 a'h) - 2J_n(\alpha_1 a'h) + J_{n+2}(\alpha_1 a'h)) -$$
$$-\frac{MG}{MT}\frac{\alpha_1}{2a'h}(J_{n-1}(\alpha_1 a'h) - J_{n+1}(\alpha_1 a'h))$$

$$a_{22} = \frac{c_{11}\alpha_2^2}{4}(J_{n-2}(\alpha_2 a'h) - 2J_n(\alpha_2 a'h) + J_{n+2}(\alpha_2 a'h)) + c_{12}(\frac{1}{2a'h}\alpha_2(J_{n-1}(\alpha_2 a'h) - J_{n+1}(\alpha_2 a'h)) -$$

$$-(\frac{n}{a'h})^2 J_n(\alpha_2 a'h)) - c_{13}\frac{KS}{T}J_n(\alpha_2 a'h) - \frac{MG}{4M'T}\alpha_2^2(J_{n-2}(\alpha_2 a'h) - 2J_n(\alpha_2 a'h) + J_{n+2}(\alpha_2 a'h)) -$$

$$-\frac{MG}{M'T}\frac{\alpha_2}{2a'h}(J_{n-1}(\alpha_2 a'h) - J_{n+1}(\alpha_2 a'h))$$

$$a_{23} = \frac{c_{11}\alpha_3^2}{4}(J_{n-2}(\alpha_3 a'h) - 2J_n(\alpha_3 a'h) + J_{n+2}(\alpha_3 a'h)) + c_{12}(\frac{1}{2a'h}\alpha_3(J_{n-1}(\alpha_3 a'h) - J_{n+1}(\alpha_3 a'h)) -$$

$$-(\frac{n}{a'h})^2 J_n(\alpha_3 a'h)) - c_{13}\frac{KS}{T}J_n(\alpha_3 a'h) - \frac{MG}{4M'T}\alpha_3^2(J_{n-2}(\alpha_3 a'h) - 2J_n(\alpha_3 a'h) + J_{n+2}(\alpha_3 a'h)) -$$

$$-\frac{MG}{M'T}\frac{\alpha_1}{2a'h}(J_{n-1}(\alpha_3 a'h) - J_{n+1}(\alpha_3 a'h))$$

$$a_{24} = c_{11}\frac{n}{(a'h)^2}J_n(\alpha_4 a'h) + \frac{n}{2a'h}\alpha_4(c_{12} - c_{11})(J_{n-1}(\alpha_4 a'h) - J_{n+1}(\alpha_4 a'h))$$

$$a_{25} = \frac{c_{11}\alpha_1^2}{4}(Y_{n-2}(\alpha_1 a'h) - 2Y_n(\alpha_1 a'h) + Y_{n+2}(\alpha_1 a'h)) + c_{12}(\frac{1}{2a'h}\alpha_1(Y_{n-1}(\alpha_1 a'h) - Y_{n+1}(\alpha_1 a'h)) -$$

$$-(\frac{n}{a'h})^2 Y_n(\alpha_1 a'h)) - c_{13}\frac{KS}{T}Y_n(\alpha_1 a'h) - \frac{MG}{4M'T}\alpha_1^2(Y_{n-2}(\alpha_1 a'h) - 2Y_n(\alpha_1 a'h) + Y_{n+2}(\alpha_1 a'h)) -$$

$$-\frac{MG}{M'T}\frac{\alpha_1}{2a'h}(Y_{n-1}(\alpha_1 a'h) - Y_{n+1}(\alpha_1 a'h))$$

$$a_{26} = \frac{c_{11}\alpha_2^2}{4}(Y_{n-2}(\alpha_2 a'h) - 2Y_n(\alpha_2 a'h) + Y_{n+2}(\alpha_2 a'h)) + c_{12}(\frac{1}{2a'h}\alpha_2(Y_{n-1}(\alpha_2 a'h) - Y_{n+1}(\alpha_2 a'h)) -$$

$$-(\frac{n}{a'h})^2 Y_n(\alpha_2 a'h)) - c_{13}\frac{KS}{T}Y_n(\alpha_2 a'h) - \frac{MG}{4M'T}\alpha_2^2(Y_{n-2}(\alpha_2 a'h) - 2Y_n(\alpha_2 a'h) + Y_{n+2}(\alpha_2 a'h)) -$$

$$-\frac{MG}{M'T}\frac{\alpha_2}{2a'h}(Y_{n-1}(\alpha_2 a'h) - Y_{n+1}(\alpha_2 a'h))$$

$$a_{27} = \frac{c_{11}\alpha_3^2}{4}(Y_{n-2}(\alpha_3 a'h) - 2Y_n(\alpha_3 a'h) + Y_{n+2}(\alpha_3 a'h)) + c_{12}(\frac{1}{2a'h}\alpha_3(Y_{n-1}(\alpha_3 a'h) - Y_{n+1}(\alpha_3 a'h)) -$$

$$-(\frac{n}{a'h})^2 Y_n(\alpha_3 a'h)) - c_{13}\frac{KS}{T}Y_n(\alpha_3 a'h) - \frac{MG}{4M'T}\alpha_3^2(Y_{n-2}(\alpha_3 a'h) - 2Y_n(\alpha_3 a'h) + Y_{n+2}(\alpha_3 a'h)) -$$

$$-\frac{MG}{M'T}\frac{\alpha_1}{2a'h}(Y_{n-1}(\alpha_3 a'h) - Y_{n+1}(\alpha_3 a'h))$$

$$a_{28} = c_{11}\frac{n}{(a'h)^2}Y_n(\alpha_4 a'h) + \frac{n}{2a'h}\alpha_4(c_{12} - c_{11})(Y_{n-1}(\alpha_4 a'h) - Y_{n+1}(\alpha_4 a'h))$$

$$a_{31} = c_{66}[\frac{2n}{(a'h)^2}J_n(\alpha_1 a'h) - \frac{n}{a'h}\alpha_1(J_{n-1}(\alpha_1 a'h) - J_{n+1}(\alpha_1 a'h))]$$

$$a_{32} = c_{66}[\frac{2n}{(a'h)^2}J_n(\alpha_2 a'h) - \frac{n}{a'h}\alpha_2(J_{n-1}(\alpha_2 a'h) - J_{n+1}(\alpha_2 a'h))]$$

$$a_{33} = c_{66}[\frac{2n}{(a'h)^2}J_n(\alpha_3 a'h) - \frac{n}{a'h}\alpha_3(J_{n-1}(\alpha_3 a'h) - J_{n+1}(\alpha_3 a'h))]$$

$$a_{34} = c_{66}[-\alpha_4^2(J_{n-2}(\alpha_4 a'h) - 2J_n(\alpha_4 a'h) + J_{n+2}(\alpha_4 a'h)) - (\frac{n}{a'h})^2 J_n(\alpha_4 a'h) -$$

$$-\frac{\alpha_4}{2a'h}(J_{n-1}(\alpha_4 a'h) - J_{n+1}(\alpha_4 a'h))]$$

$$a_{45} = c_{66}[\frac{2n}{(a'h)^2}Y_n(\alpha_1 a'h) - \frac{n}{a'h}\alpha_1(Y_{n-1}(\alpha_1 a'h) - Y_{n+1}(\alpha_1 a'h))]$$

$$a_{36} = c_{66}[\frac{2n}{(a'h)^2}Y_n(\alpha_2 a'h) - \frac{n}{a'h}\alpha_2(Y_{n-1}(\alpha_2 a'h) - Y_{n+1}(\alpha_2 a'h))]$$

$$a_{37} = c_{66}[\frac{2n}{(a'h)^2}Y_n(\alpha_3 a'h) - \frac{n}{a'h}\alpha_3(Y_{n-1}(\alpha_3 a'h) - Y_{n+1}(\alpha_3 a'h))]$$

$$a_{38} = c_{66}[-\alpha_4^2(Y_{n-2}(\alpha_4 a'h) - 2Y_n(\alpha_4 a'h) + Y_{n+2}(\alpha_4 a'h)) -$$

$$-(\frac{n}{a'h})^2 Y_n(\alpha_4 a'h) - \frac{\alpha_4}{2a'h}(Y_{n-1}(\alpha_4 a'h) - Y_{n+1}(\alpha_4 a'h))]$$

$$a_{41} = c_{44}[(\frac{iK}{2} - \frac{iS}{2hT})\alpha_1(J_{n-1}(\alpha_1 a'h) - J_{n+1}(\alpha_1 a'h))]$$

$$a_{42} = c_{44}[(\frac{iK}{2} - \frac{iS}{2hT})\alpha_2(J_{n-1}(\alpha_2 a'h) - J_{n+1}(\alpha_2 a'h))]$$

$$a_{43} = c_{44}[(\frac{iK}{2} - \frac{iS}{2hT})\alpha_3(J_{n-1}(\alpha_3 a'h) - J_{n+1}(\alpha_3 a'h))]$$

$$a_{44} = -c_{44}\frac{iKn}{a'h}J_n(\alpha_4 a'h)$$

$$a_{45} = c_{44}[(\frac{iK}{2} - \frac{iS}{2hT})\alpha_1(Y_{n-1}(\alpha_1 a'h) - Y_{n+1}(\alpha_1 a'h))]$$

$$a_{46} = c_{44}[(\frac{iK}{2} - \frac{iS}{2hT})\alpha_2(Y_{n-1}(\alpha_2 a'h) - Y_{n+1}(\alpha_2 a'h))]$$

$$a_{47} = c_{44}[(\frac{iK}{2} - \frac{iS}{2hT})\alpha_3(Y_{n-1}(\alpha_3 a'h) - Y_{n+1}(\alpha_3 a'h))]$$

$$a_{48} = -c_{44}\frac{iKn}{a'h}Y_n(\alpha_4 a'h)$$

The remaining four rows can be obtained from the above equations by replacing $\overline{a}$ by $\overline{b}$