

Input =

$$A_0 == A_{11} - A_{12} A_{22}^{-1} A_{21}$$

$$B_0 == B_1 - A_{12} A_{22}^{-1} B_2$$

$$G_1 == -1 R^{-1} B_1^T k_{10} - R^{-1} B_2^T k_{20}$$

$$G_2 == -1 R^{-1} B_2^T k_{30}$$

$$k_{10} == k_{10}^T$$

$$k_{30} == k_{30}^T$$

$$M_0 == M_1 - M_2 A_{22}^{-1} A_{21}$$

$$N_0 == -1 M_2 A_{22}^{-1} B_2$$

$$R == R^T$$

$$R_0 == R + N_0^T N_0$$

$$R_0 == R_0^T$$

$$R^{-1} == R^{T-1}$$

$$R_0^{-1} == R_0^{T-1}$$

$$A_0 A_0^{-1} == 1$$

$$A_{11} A_{11}^{-1} == 1$$

$$A_{22} A_{22}^{-1} == 1$$

$$R R^{-1} == 1$$

$$R_0 R_0^{-1} == 1$$

$$A_0^{-1} A_0 == 1$$

$$A_{11}^{-1} A_{11} == 1$$

$$A_{22}^{-1} A_{22} == 1$$

$$R^{-1} R == 1$$

$$R_0^{-1} R_0 == 1$$

$$(A_{22} + B_2 G_2)^{-1} (A_{22} + B_2 G_2) == 1$$

$$(A_{22} - B_2 R^{-1} B_2^T k_{30})^{-1} (A_{22} - B_2 R^{-1} B_2^T k_{30}) == 1$$

$$(A_{22} + B_2 G_2) (A_{22} + B_2 G_2)^{-1} == 1$$

$$(A_{22} - B_2 R^{-1} B_2^T k_{30}) (A_{22} - B_2 R^{-1} B_2^T k_{30})^{-1} == 1$$

$$A_0^T A_0^{T-1} == 1$$

$$A_{11}^T A_{11}^{T-1} == 1$$

$$A_{22}^T A_{22}^{T-1} == 1$$

$$(G_2^T B_2^T + A_{22}^T) (A_{22} + B_2 G_2)^{T-1} == 1$$

$$(-1 k_{30}^T B_2 R^{T-1} B_2^T + A_{22}^T) (A_{22} - B_2 R^{-1} B_2^T k_{30})^{T-1} == 1$$

$$R^T R^{T-1} == 1$$

$$R_0^T R_0^{T-1} == 1$$

$$A_0^{T-1} A_0^T == 1$$

$$A_{11}^{T-1} A_{11}^T == 1$$

$$A_{22}^{T-1} A_{22}^T == 1$$

$$R^{T-1} R^T == 1$$

$$R_0^{T-1} R_0^T == 1$$

$$(A_{22} + B_2 G_2)^{T-1} (G_2^T B_2^T + A_{22}^T) == 1$$

$$(A_{22} - B_2 R^{-1} B_2^T k_{30})^{T-1} (-1 k_{30}^T B_2 R^{T-1} B_2^T + A_{22}^T) == 1$$

$$A_0^T == -1 A_{21}^T A_{22}^{T-1} A_{12}^T + A_{11}^T$$

$$B_0^T == -1 B_2^T A_{22}^{T-1} A_{12}^T + B_1^T$$

$$G_1^T == -1 k_{20} B_2 R^{T-1} - k_{10}^T B_1 R^{T-1}$$

$$G_2^T == -1 k_{30}^T B_2 R^{T-1}$$

$$k_{10}^T == k_{10}$$

$$k_{30}^T == k_{30}$$

$$M_0^T == -1 A_{21}^T A_{22}^{T-1} M_2^T + M_1^T$$

$$N_0^T == -1 B_2^T A_{22}^{T-1} M_2^T$$

$$R^T == R$$

$$R_0^T == R_0$$

$R_0^T == N_0^T N_0 + R^T$
 $R^{T-1} == R^{-1}$
 $R_0^{T-1} == R_0^{-1}$
 $k_{10} A_{12} + k_{20} A_{22} + A_{21}^T k_{30} + M_1^T M_2 - (k_{10} B_1 + k_{20} B_2) R^{-1} B_2^T k_{30}$
 $k_{10} A_{11} + k_{20} A_{21} + A_{11}^T k_{10} + A_{21}^T k_{20} + M_1^T M_1 - (k_{10} B_1 + k_{20} B_2) R^{-1} B_1^T k_{10} - (k_{10} B_1 + k_{20} B_2) R^{-1} B_2^T k_{20}$
 $k_{20} A_{21} + A_{11}^T k_{10} + A_{21}^T k_{20} + k_{10}^T A_{11} + M_1^T M_1 - k_{20} B_2 R^{T-1} (B_1^T k_{10}^T + B_2^T k_{20}^T) - k_{10}^T B_1 R^{T-1} (B_1^T k_{10}^T + B_2^T k_{20}^T)$
 $A_{12}^T k_{10}^T + A_{22}^T k_{20}^T + k_{30}^T A_{21} + M_2^T M_1 - k_{30}^T B_2 R^{T-1} (B_1^T k_{10}^T + B_2^T k_{20}^T)$
 $k_{30} A_{22} + A_{22}^T k_{30} + M_2^T M_2 - k_{30} B_2 R^{-1} B_2^T k_{30}$
 $A_{22}^T k_{30}^T + k_{30}^T A_{22} + M_2^T M_2 - k_{30}^T B_2 R^{T-1} B_2^T k_{30}^T$
 File Name = FindK10

NCMakeGB Iterations = 4
 NCMakeGB on Digested Iterations = 5
 SmallBasis Iterations = 5
 SmallBasis on Knowns Iterations = 6
 Deselect → {}
 UserSelect → {}
 RR → True
 RRByCat → False
 SB → False
 SBByCat → False
 DegreeCap → 14
 DegreeSumCap → 17
 DegreeCapSB → 15
 DegreeSumCapSB → 18
 NCCV → True

THE ORDER IS NOW THE FOLLOWING:

$N_0 < N_0^T < M_0 < M_0^T < R_0 < R_0^{T-1} < R_0^T < R_0^{-1} < A_0 < A_0^{T-1} < A_0^T < A_0^{-1} < B_0 < B_0^T \ll$
 $k_{10} < k_{10}^T \ll B_1 < B_1^T < B_2 < B_2^T < M_1 < M_1^T < M_2 < M_2^T < R < R^{T-1} < R^T < R^{-1} <$
 $A_{11} < A_{11}^{T-1} < A_{11}^T < A_{11}^{-1} < A_{12} < A_{12}^T < A_{21} < A_{21}^T < A_{22} < (A_{22} + B_2 G_2)^{T-1} < A_{22}^{T-1} < A_{22}^T <$
 $(A_{22} + B_2 G_2)^{-1} < A_{22}^{-1} < (A_{22} - B_2 R^{-1} B_2^T k_{30})^{-1} < (A_{22} - B_2 R^{-1} B_2^T k_{30})^{T-1} \ll k_{30} < k_{30}^T \ll$
 $k_{20} < k_{20}^T \ll G_1 < G_1^T < G_2 < G_2^T$

YOUR SESSION HAS DIGESTED
 THE FOLLOWING RELATIONS

THE FOLLOWING VARIABLES HAVE BEEN SOLVED FOR:

$\{G_1, G_2, k_{20}, R, R^{-1}, R_0^{-1}, (A_{22} - B_2 R^{-1} B_2^T k_{30})^{-1}, G_1^T, G_2^T, k_{10}^T, k_{20}^T, k_{30}^T, R^T, R_0^T, (A_{22} - B_2 R^{-1} B_2^T k_{30})^{T-1}\}$

The corresponding rules are the following:

$G_1 \rightarrow -1 R_0^{T-1} B_0^T k_{10} + R^{T-1} B_2^T (A_{22} + B_2 G_2)^{T-1} k_{30} A_{21} + R^{T-1} B_2^T (A_{22} + B_2 G_2)^{T-1} M_2^T M_1 - R^{T-1} B_2^T (A_{22} + B_2 G_2)^{T-1} k_{30} B_2 R_0^{T-1} B_0^T k_{10} + R^{T-1} B_2^T (A_{22} + B_2 G_2)^{T-1} M_2^T N_0 R_0^{T-1} B_0^T k_{10}$

$G_2 \rightarrow -1 R^{T-1} B_2^T k_{30}$

$k_{20} \rightarrow -1 k_{10} A_{12} A_{22}^{-1} + A_{21}^T A_{22}^{T-1} k_{30} - M_0^T M_2 (A_{22} + B_2 G_2)^{-1} - k_{10} B_0 R_0^{T-1} B_2^T A_{22}^{T-1} k_{30} + k_{10} B_0 R_0^{T-1} N_0^T M_2 A_{22}^{-1}$

$R \rightarrow R_0 - N_0^T N_0$

$R^{-1} \rightarrow R^{T-1}$

$R_0^{-1} \rightarrow R_0^{T-1}$

$(A_{22} - B_2 R^{-1} B_2^T k_{30})^{-1} \rightarrow (A_{22} + B_2 G_2)^{-1}$

$$G_1^T \rightarrow -1 k_{10} B_0 R_0^{T-1} - A_{21}^T A_{22}^{T-1} k_{30} B_2 R^{T-1} + M_0^T M_2 (A_{22} + B_2 G_2)^{-1} B_2 R^{T-1} + k_{10} B_0 R_0^{T-1} B_2^T A_{22}^{T-1} k_{30} B_2 R^{T-1}$$

$$G_2^T \rightarrow -1 k_{30} B_2 R^{T-1}$$

$$k_{10}^T \rightarrow k_{10}$$

$$k_{20}^T \rightarrow -1 A_{22}^{T-1} A_{12}^T k_{10} - (A_{22} + B_2 G_2)^{T-1} k_{30} A_{21} - (A_{22} + B_2 G_2)^{T-1} M_2^T M_1 + A_{22}^{T-1} M_2^T N_0 R_0^{T-1} B_0^T k_{10} + (A_{22} + B_2 G_2)^{T-1} k_{30} B_2 R_0^{T-1} B_0^T k_{10} - (A_{22} + B_2 G_2)^{T-1} M_2^T N_0 R_0^{T-1} B_0^T k_{10}$$

$$k_{30}^T \rightarrow k_{30}$$

$$R^T \rightarrow R_0 - N_0^T N_0$$

$$R_0^T \rightarrow R_0$$

$$(A_{22} - B_2 R^{-1} B_2^T k_{30})^{T-1} \rightarrow (A_{22} + B_2 G_2)^{T-1}$$

The expressions with unknown variables {}
and knowns $\{A_0, R_0, A_0^{-1}, A_0^T, A_0^{T-1}, R_0^{T-1}\}$

$$A_0 A_0^{-1} \rightarrow 1$$

$$R_0 R_0^{T-1} \rightarrow 1$$

$$A_0^{-1} A_0 \rightarrow 1$$

$$A_0^T A_0^{T-1} \rightarrow 1$$

$$A_0^{T-1} A_0^T \rightarrow 1$$

$$R_0^{T-1} R_0 \rightarrow 1$$

USER CREATIONS APPEAR BELOW

SOME RELATIONS WHICH APPEAR BELOW

MAY BE UNDIGESTED

THE FOLLOWING VARIABLES HAVE NOT BEEN SOLVED FOR:

$\{A_0, A_{11}, A_{12}, A_{21}, A_{22}, B_0, B_1, B_2, k_{10}, k_{30}, M_0, M_1, M_2, N_0, R_0, A_0^{-1}, A_{11}^{-1}, A_{22}^{-1}, (A_{22} + B_2 G_2)^{-1}, A_0^T, A_{11}^T, A_{12}^T, A_{21}^T, A_{22}^T, B_0^T, B_1^T, B_2^T, M_0^T, M_1^T, M_2^T, N_0^T, A_0^{T-1}, A_{11}^{T-1}, A_{22}^{T-1}, R^{T-1}, R_0^{T-1}, (A_{22} + B_2 G_2)^{T-1}\}$

The expressions with unknown variables $\{k_{10}\}$
and knowns $\{A_0, B_0, M_0, N_0, A_0^T, B_0^T, M_0^T, N_0^T, R_0^{T-1}\}$

$$k_{10} B_0 R_0^{T-1} B_0^T k_{10} \rightarrow k_{10} A_0 + A_0^T k_{10} + M_0^T M_0 - k_{10} B_0 R_0^{T-1} N_0^T M_0 - M_0^T N_0 R_0^{T-1} B_0^T k_{10} - M_0^T N_0 R_0^{T-1} N_0^T M_0$$

The expressions with unknown variables $\{R^{T-1}\}$

and knowns $\{N_0, R_0, N_0^T\}$

$$N_0^T N_0 R^{T-1} \rightarrow -1 + R_0 R^{T-1}$$

$$R^{T-1} N_0^T N_0 \rightarrow -1 + R^{T-1} R_0$$

The expressions with unknown variables $\{A_{11}^{-1}, A_{11}\}$

and knowns {}

$$A_{11} A_{11}^{-1} \rightarrow 1$$

$$A_{11}^{-1} A_{11} \rightarrow 1$$

The expressions with unknown variables $\{A_{22}^{-1}, A_{22}\}$
and knowns $\{\}$

$$A_{22} A_{22}^{-1} \rightarrow 1$$

$$A_{22}^{-1} A_{22} \rightarrow 1$$

The expressions with unknown variables $\{A_{11}^T, A_{11}^{T-1}\}$
and knowns $\{\}$

$$A_{11}^T A_{11}^{T-1} \rightarrow 1$$

$$A_{11}^{T-1} A_{11}^T \rightarrow 1$$

The expressions with unknown variables $\{A_{22}^T, A_{22}^{T-1}\}$
and knowns $\{\}$

$$A_{22}^T A_{22}^{T-1} \rightarrow 1$$

$$A_{22}^{T-1} A_{22}^T \rightarrow 1$$

The expressions with unknown variables $\{A_{22}^{-1}, M_2, B_2\}$
and knowns $\{N_0\}$

$$M_2 A_{22}^{-1} B_2 \rightarrow -1 N_0$$

The expressions with unknown variables $\{A_{22}^{T-1}, M_2^T, B_2^T\}$
and knowns $\{N_0^T\}$

$$B_2^T A_{22}^{T-1} M_2^T \rightarrow -1 N_0^T$$

The expressions with unknown variables $\{A_{22}^{-1}, A_{12}, B_2, B_1\}$
and knowns $\{B_0\}$

$$A_{12} A_{22}^{-1} B_2 \rightarrow -1 B_0 + B_1$$

The expressions with unknown variables $\{A_{22}^{-1}, A_{21}, A_{12}, A_{11}\}$
and knowns $\{A_0\}$

$$A_{12} A_{22}^{-1} A_{21} \rightarrow -1 A_0 + A_{11}$$

The expressions with unknown variables $\{A_{22}^{-1}, A_{21}, M_2, M_1\}$
and knowns $\{M_0\}$

$$M_2 A_{22}^{-1} A_{21} \rightarrow -1 M_0 + M_1$$

The expressions with unknown variables $\{A_{22}^{T-1}, A_{12}^T, B_2^T, B_1^T\}$
and knowns $\{B_0^T\}$

$$B_2^T A_{22}^{T-1} A_{12}^T \rightarrow -1 B_0^T + B_1^T$$

The expressions with unknown variables $\{A_{22}^{T-1}, A_{21}^T, A_{12}^T, A_{11}^T\}$
and knowns $\{A_0^T\}$

$$A_{21}^T A_{22}^{T-1} A_{12}^T \rightarrow -1 A_0^T + A_{11}^T$$

The expressions with unknown variables $\{A_{22}^{T-1}, A_{21}^T, M_2^T, M_1^T\}$
and knowns $\{M_0^T\}$

$$A_{21}^T A_{22}^{T-1} M_2^T \rightarrow -1 M_0^T + M_1^T$$

The expressions with unknown variables $\{k_{30}, (A_{22} + B_2 G_2)^{-1}, A_{22}^{T-1}, M_2^T, M_2\}$
and knowns $\{\}$

$$k_{30} (A_{22} + B_2 G_2)^{-1} \rightarrow -1 A_{22}^{T-1} k_{30} - A_{22}^{T-1} M_2^T M_2 (A_{22} + B_2 G_2)^{-1}$$

The expressions with unknown variables $\{k_{30}, A_{22}^{T-1}, (A_{22} + B_2 G_2)^{T-1}, M_2^T, B_2\}$
and knowns $\{N_0, N_0^T, R_0^{T-1}\}$

$$-1 A_{22}^{T-1} M_2^T + (A_{22} + B_2 G_2)^{T-1} M_2^T + ((A_{22}^{T-1} M_2^T - (A_{22} + B_2 G_2)^{T-1} M_2^T) N_0 + (A_{22} + B_2 G_2)^{T-1} k_{30} B_2) R_0^{T-1} N_0^T == 0$$

The expressions with unknown variables $\{k_{30}, (A_{22} + B_2 G_2)^{T-1}, A_{22}, M_2^T, M_2\}$
and knowns $\{\}$

$$(A_{22} + B_2 G_2)^{T-1} k_{30} A_{22} \rightarrow -1 k_{30} - (A_{22} + B_2 G_2)^{T-1} M_2^T M_2$$

The expressions with unknown variables $\{k_{30}, A_{22}^{-1}, (A_{22} + B_2 G_2)^{-1}, A_{22}^{T-1}, M_2, B_2^T\}$
and knowns $\{N_0, N_0^T, R_0^{T-1}\}$

$$M_2 A_{22}^{-1} - M_2 (A_{22} + B_2 G_2)^{-1} + N_0 R_0^{T-1} (B_2^T A_{22}^{T-1} k_{30} - N_0^T M_2 A_{22}^{-1}) == 0$$

The expressions with unknown variables $\{k_{30}, (A_{22} + B_2 G_2)^{-1}, A_{22}, R^{T-1}, B_2^T, B_2\}$
and knowns $\{\}$

$$(A_{22} + B_2 G_2)^{-1} B_2 R^{T-1} B_2^T k_{30} \rightarrow -1 + (A_{22} + B_2 G_2)^{-1} A_{22}$$

The expressions with unknown variables $\{k_{30}, A_{22}^T, (A_{22} + B_2 G_2)^{T-1}, R^{T-1}, B_2^T, B_2\}$
and knowns $\{\}$

$$k_{30} B_2 R^{T-1} B_2^T (A_{22} + B_2 G_2)^{T-1} \rightarrow -1 + A_{22}^T (A_{22} + B_2 G_2)^{T-1}$$

The expressions with unknown variables $\{k_{30}, A_{22}^{T-1}, (A_{22} + B_2 G_2)^{T-1}, R^{T-1}, M_2^T, B_2\}$
and knowns $\{N_0, R_0^{T-1}\}$

$$-1 ((A_{22}^{T-1} M_2^T - (A_{22} + B_2 G_2)^{T-1} M_2^T) N_0 + (A_{22} + B_2 G_2)^{T-1} k_{30} B_2) R_0^{T-1} + (A_{22} + B_2 G_2)^{T-1} k_{30} B_2 R^{T-1} == 0$$

The expressions with unknown variables $\{k_{30}, A_{22}^{-1}, (A_{22} + B_2 G_2)^{-1}, A_{22}^{T-1}, R^{T-1}, M_2, B_2^T\}$
and knowns $\{N_0^T, R_0^{T-1}\}$

$$R^{T-1} B_2^T A_{22}^{T-1} k_{30} \rightarrow R^{T-1} N_0^T M_2 (A_{22} + B_2 G_2)^{-1} + R_0^{T-1} B_2^T A_{22}^{T-1} k_{30} - R_0^{T-1} N_0^T M_2 A_{22}^{-1}$$

The expressions with unknown variables $\{k_{30}, A_{22}^T, A_{22}^{T-1}, (A_{22} + B_2 G_2)^{T-1}, M_2^T, B_2^T, B_2\}$
and knowns $\{N_0, R_0^{T-1}\}$

$$1 - (A_{22} + B_2 G_2)^{T-1} A_{22}^T + ((A_{22}^{T-1} M_2^T - (A_{22} + B_2 G_2)^{T-1} M_2^T) N_0 + (A_{22} + B_2 G_2)^{T-1} k_{30} B_2) R_0^{T-1} B_2^T == 0$$

The expressions with unknown variables $\{k_{30}, A_{22}^{T-1}, (A_{22} + B_2 G_2)^{T-1}, A_{12}^T, M_2^T, B_2, B_1^T\}$
and knowns $\{N_0, B_0^T, R_0^{T-1}\}$

$$A_{22}^{T-1} A_{12}^T - (A_{22} + B_2 G_2)^{T-1} A_{12}^T - ((A_{22}^{T-1} M_2^T - (A_{22} + B_2 G_2)^{T-1} M_2^T) N_0 + (A_{22} + B_2 G_2)^{T-1} k_{30} B_2) R_0^{T-1} (B_0^T - B_1^T) == 0$$

The expressions with unknown variables $\{k_{30}, A_{22}^{-1}, (A_{22} + B_2 G_2)^{-1}, A_{22}^{T-1}, A_{12}, M_2, B_2^T, B_1\}$
and knowns $\{B_0, N_0^T, R_0^{T-1}\}$

$$-1 A_{12} A_{22}^{-1} + A_{12} (A_{22} + B_2 G_2)^{-1} - (B_0 - B_1) R_0^{T-1} (B_2^T A_{22}^{T-1} k_{30} - N_0^T M_2 A_{22}^{-1}) == 0$$

The expressions with unknown variables $\{k_{30}, A_{22}^{-1}, (A_{22} + B_2 G_2)^{-1}, A_{22}^{T-1}, A_{22}, M_2, B_2^T, B_2\}$
and knowns $\{N_0^T, R_0^{T-1}\}$

$$-1 + A_{22} (A_{22} + B_2 G_2)^{-1} + B_2 R_0^{T-1} (B_2^T A_{22}^{T-1} k_{30} - N_0^T M_2 A_{22}^{-1}) == 0$$

The expressions with unknown variables $\{k_{30}, A_{22}^{-1}, (A_{22} + B_2 G_2)^{-1}, A_{22}^{T-1}, R^{T-1}, M_2^T, M_2, B_2^T\}$
and knowns $\{N_0, R_0, N_0^T\}$

$$\begin{array}{l}
N_0 (R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{T-1} A_{22}^{T-1} k_{30}) \quad - \\
R^{T-1} N_0^T M_2 (A_{22} + B_2 G_2)^{-1} (A_{22} + B_2 G_2)^{-1} (A_{22} + B_2 G_2)^{-1} \quad - \\
R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{T-1} M_2^T M_2 (A_{22} + B_2 G_2)^{-1} (A_{22} + B_2 G_2)^{-1} \quad + \\
R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{T-1} A_{22}^{T-1} M_2^T M_2 (A_{22} + B_2 G_2)^{-1} \quad + \\
M_2 A_{22}^{-1} (A_{22} + B_2 G_2)^{-1} (A_{22} + B_2 G_2)^{-1} \quad - \\
M_2 (A_{22} + B_2 G_2)^{-1} (A_{22} + B_2 G_2)^{-1} (A_{22} + B_2 G_2)^{-1} == 0 \\
R_0 (R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{T-1} A_{22}^{T-1} k_{30}) \quad - \\
R^{T-1} N_0^T M_2 (A_{22} + B_2 G_2)^{-1} (A_{22} + B_2 G_2)^{-1} (A_{22} + B_2 G_2)^{-1} \quad - \\
R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{T-1} M_2^T M_2 (A_{22} + B_2 G_2)^{-1} (A_{22} + B_2 G_2)^{-1} \quad + \\
R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{T-1} A_{22}^{T-1} M_2^T M_2 (A_{22} + B_2 G_2)^{-1} \quad - \quad B_2^T A_{22}^{T-1} A_{22}^{T-1} A_{22}^{T-1} k_{30} \quad + \\
N_0^T M_2 A_{22}^{-1} (A_{22} + B_2 G_2)^{-1} (A_{22} + B_2 G_2)^{-1} \quad + \\
B_2^T A_{22}^{T-1} A_{22}^{T-1} M_2^T M_2 (A_{22} + B_2 G_2)^{-1} (A_{22} + B_2 G_2)^{-1} \quad - \\
B_2^T A_{22}^{T-1} A_{22}^{T-1} A_{22}^{T-1} M_2^T M_2 (A_{22} + B_2 G_2)^{-1} == 0
\end{array}$$

The expressions with unknown variables $\{k_{30}, A_{22}^T, A_{22}, R^{T-1}, M_2^T, M_2, B_2^T, B_2\}$
and knowns $\{\}$

$$k_{30} B_2 R^{T-1} B_2^T k_{30} \rightarrow k_{30} A_{22} + A_{22}^T k_{30} + M_2^T M_2$$

The expressions with unknown variables $\{A_{22}^{-1}, (A_{22} + B_2 G_2)^{-1}, A_{22}^{T-1}, (A_{22} + B_2 G_2)^{T-1}, R^{T-1}, M_2, B_2^T, B_2\}$
and knowns $\{N_0, R_0, N_0^T, R_0^{T-1}\}$

$$\begin{array}{l}
-1 N_0 (R^{T-1} N_0^T M_2 (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} B_2 R_0^{T-1} B_2^T A_{22}^{T-1}) \quad - \\
R^{T-1} N_0^T M_2 (A_{22} + B_2 G_2)^{-1} (A_{22} + B_2 G_2)^{-1} B_2 R^{T-1} B_2^T (A_{22} + B_2 G_2)^{T-1} \quad + \\
(M_2 A_{22}^{-1} A_{22}^{-1} B_2 \quad - \quad M_2 (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} B_2) R_0^{T-1} B_2^T A_{22}^{T-1} \quad - \\
M_2 A_{22}^{-1} (A_{22} + B_2 G_2)^{-1} B_2 R^{T-1} B_2^T (A_{22} + B_2 G_2)^{T-1} \quad + \\
M_2 (A_{22} + B_2 G_2)^{-1} (A_{22} + B_2 G_2)^{-1} B_2 R^{T-1} B_2^T (A_{22} + B_2 G_2)^{T-1} == 0 \\
(N_0^T M_2 A_{22}^{-1} A_{22}^{-1} B_2 \quad - \quad R_0 R^{T-1} N_0^T M_2 (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} B_2) R_0^{T-1} B_2^T A_{22}^{T-1} \quad - \\
N_0^T M_2 A_{22}^{-1} (A_{22} + B_2 G_2)^{-1} B_2 R^{T-1} B_2^T (A_{22} + B_2 G_2)^{T-1} \quad + \\
R_0 R^{T-1} N_0^T M_2 (A_{22} + B_2 G_2)^{-1} (A_{22} + B_2 G_2)^{-1} B_2 R^{T-1} B_2^T (A_{22} + B_2 G_2)^{T-1} == 0
\end{array}$$

The expressions with unknown variables $\{k_{30}, A_{22}^{-1}, (A_{22} + B_2 G_2)^{-1}, A_{22}^{T-1}, (A_{22} + B_2 G_2)^{T-1}, R^{T-1}, M_2^T, M_2, B_2^T\}$
and knowns $\{N_0, R_0, N_0^T\}$

$$\begin{array}{l}
N_0 (R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} k_{30}) \quad - \\
R^{T-1} N_0^T M_2 (A_{22} + B_2 G_2)^{-1} (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} \quad - \\
R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{T-1} M_2^T M_2 (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} \quad + \\
R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} M_2^T M_2 A_{22}^{-1} \quad + \quad M_2 A_{22}^{-1} (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} \quad - \\
M_2 (A_{22} + B_2 G_2)^{-1} (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} == 0 \\
N_0 (R^{T-1} B_2^T A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} A_{22}^{T-1} k_{30}) \quad - \\
R^{T-1} N_0^T M_2 (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} (A_{22} + B_2 G_2)^{-1} \quad - \\
R^{T-1} B_2^T A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} M_2^T M_2 A_{22}^{-1} (A_{22} + B_2 G_2)^{-1} \quad + \\
R^{T-1} B_2^T A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} A_{22}^{T-1} M_2^T M_2 (A_{22} + B_2 G_2)^{-1} \quad + \\
M_2 A_{22}^{-1} A_{22}^{-1} (A_{22} + B_2 G_2)^{-1} - M_2 (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} (A_{22} + B_2 G_2)^{-1} == 0 \\
N_0 (R^{T-1} B_2^T A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} (A_{22} + B_2 G_2)^{T-1} k_{30}) \quad - \\
R^{T-1} N_0^T M_2 (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} A_{22}^{-1} - R^{T-1} B_2^T A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} M_2^T M_2 A_{22}^{-1} A_{22}^{-1} \quad + \\
R^{T-1} B_2^T A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} (A_{22} + B_2 G_2)^{T-1} M_2^T M_2 A_{22}^{-1} \quad + \quad M_2 A_{22}^{-1} A_{22}^{-1} A_{22}^{-1} \quad - \\
M_2 (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} A_{22}^{-1} == 0
\end{array}$$

$$\begin{aligned}
& R_0 (R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} k_{30} & - \\
& R^{T-1} N_0^T M_2 (A_{22} + B_2 G_2)^{-1} (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} & - \\
& R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{T-1} M_2^T M_2 (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} & + \\
& R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} M_2^T M_2 A_{22}^{-1} & - B_2^T A_{22}^{T-1} A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} k_{30} + \\
& N_0^T M_2 A_{22}^{-1} (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} & + B_2^T A_{22}^{T-1} A_{22}^{T-1} M_2^T M_2 (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} - \\
& B_2^T A_{22}^{T-1} A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} M_2^T M_2 A_{22}^{-1} == 0 & \\
& R_0 (R^{T-1} B_2^T A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} A_{22}^{T-1} k_{30} & - \\
& R^{T-1} N_0^T M_2 (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} (A_{22} + B_2 G_2)^{-1} & - \\
& R^{T-1} B_2^T A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} M_2^T M_2 A_{22}^{-1} (A_{22} + B_2 G_2)^{-1} & + \\
& R^{T-1} B_2^T A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} A_{22}^{T-1} M_2^T M_2 (A_{22} + B_2 G_2)^{-1} & - \\
& B_2^T A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} A_{22}^{T-1} k_{30} & + \\
& N_0^T M_2 A_{22}^{-1} A_{22}^{-1} (A_{22} + B_2 G_2)^{-1} & + B_2^T A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} M_2^T M_2 A_{22}^{-1} (A_{22} + B_2 G_2)^{-1} - \\
& B_2^T A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} A_{22}^{T-1} M_2^T M_2 (A_{22} + B_2 G_2)^{-1} == 0 & \\
& R_0 (R^{T-1} B_2^T A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} (A_{22} + B_2 G_2)^{T-1} k_{30} & - \\
& R^{T-1} N_0^T M_2 (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} A_{22}^{-1} - R^{T-1} B_2^T A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} M_2^T M_2 A_{22}^{-1} A_{22}^{-1} & + \\
& R^{T-1} B_2^T A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} (A_{22} + B_2 G_2)^{T-1} M_2^T M_2 A_{22}^{-1} & - \\
& B_2^T A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} (A_{22} + B_2 G_2)^{T-1} k_{30} & + N_0^T M_2 A_{22}^{-1} A_{22}^{-1} A_{22}^{-1} + \\
& B_2^T A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} M_2^T M_2 A_{22}^{-1} A_{22}^{-1} & - \\
& B_2^T A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} (A_{22} + B_2 G_2)^{T-1} M_2^T M_2 A_{22}^{-1} == 0 & \\
\end{aligned}$$

The expressions with unknown variables $\{k_{30}, (A_{22} + B_2 G_2)^{-1}, A_{22}^{T-1}, A_{22}, R^{T-1}, M_2^T, M_2, B_2^T, B_2\}$

and knowns $\{N_0^T\}$

$$\begin{aligned}
& B_2 R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{T-1} A_{22}^{T-1} k_{30} & \rightarrow \\
& (A_{22} + B_2 G_2)^{-1} (A_{22} + B_2 G_2)^{-1} - A_{22} (A_{22} + B_2 G_2)^{-1} (A_{22} + B_2 G_2)^{-1} (A_{22} + B_2 G_2)^{-1} & + \\
& B_2 R^{T-1} N_0^T M_2 (A_{22} + B_2 G_2)^{-1} (A_{22} + B_2 G_2)^{-1} (A_{22} + B_2 G_2)^{-1} & + \\
& B_2 R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{T-1} M_2^T M_2 (A_{22} + B_2 G_2)^{-1} (A_{22} + B_2 G_2)^{-1} & - \\
& B_2 R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{T-1} A_{22}^{T-1} M_2^T M_2 (A_{22} + B_2 G_2)^{-1} & \\
\end{aligned}$$

The expressions with unknown variables $\{A_{22}^{-1}, (A_{22} + B_2 G_2)^{-1}, A_{22}^{T-1}, (A_{22} + B_2 G_2)^{T-1}, A_{22}, R^{T-1}, M_2, B_2^T, B_2\}$

and knowns $\{N_0^T, R_0^{T-1}\}$

$$\begin{aligned}
& -1 (A_{22}^{-1} B_2 & - \\
& A_{22} (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} B_2) R_0^{T-1} B_2^T A_{22}^{T-1} + (A_{22} + B_2 G_2)^{-1} B_2 R^{T-1} B_2^T (A_{22} + B_2 G_2)^{T-1} & - \\
& A_{22} (A_{22} + B_2 G_2)^{-1} (A_{22} + B_2 G_2)^{-1} B_2 R^{T-1} B_2^T (A_{22} + B_2 G_2)^{T-1} & - \\
& B_2 R^{T-1} N_0^T M_2 (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} B_2 R_0^{T-1} B_2^T A_{22}^{T-1} & + \\
& B_2 R^{T-1} N_0^T M_2 (A_{22} + B_2 G_2)^{-1} (A_{22} + B_2 G_2)^{-1} B_2 R^{T-1} B_2^T (A_{22} + B_2 G_2)^{T-1} == 0 & \\
\end{aligned}$$

The expressions with unknown variables $\{A_{22}^{-1}, (A_{22} + B_2 G_2)^{-1}, A_{22}^{T-1}, (A_{22} + B_2 G_2)^{T-1}, R^{T-1}, M_2^T, M_2, B_2^T, B_2\}$

and knowns $\{N_0, R_0, N_0^T, R_0^{T-1}\}$

$$\begin{aligned}
& -1 N_0 (R^{T-1} N_0^T M_2 (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} B_2 R^{T-1} & - \\
& R^{T-1} N_0^T M_2 (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} B_2 R_0^{T-1}) - (M_2 A_{22}^{-1} A_{22}^{-1} B_2 - M_2 (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} B_2 + & - \\
& N_0 R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{T-1} M_2^T N_0) R_0^{T-1} & + M_2 A_{22}^{-1} A_{22}^{-1} B_2 R^{T-1} \\
& M_2 (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} B_2 R^{T-1} + N_0 R^{T-1} B_2^T A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} M_2^T N_0 R^{T-1} == 0 & \\
& ((B_2^T A_{22}^{T-1} A_{22}^{T-1} M_2^T & - R_0 R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{T-1} M_2^T) N_0 & - N_0^T M_2 A_{22}^{-1} A_{22}^{-1} B_2 & + \\
& R_0 R^{T-1} N_0^T M_2 (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} B_2) R_0^{T-1} & - B_2^T A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} M_2^T N_0 R^{T-1} & + \\
& N_0^T M_2 A_{22}^{-1} A_{22}^{-1} B_2 R^{T-1} & + R_0 R^{T-1} B_2^T A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} M_2^T N_0 R^{T-1} & - \\
& R_0 R^{T-1} N_0^T M_2 (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} B_2 R^{T-1} == 0 & \\
\end{aligned}$$

$$\begin{aligned}
& -1 N_0 (R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{T-1} M_2^T - R^{T-1} B_2^T A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} M_2^T) + \\
& (N_0 (R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{T-1} M_2^T N_0 - R^{T-1} N_0^T M_2 (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} B_2) + M_2 A_{22}^{-1} A_{22}^{-1} B_2 - \\
& M_2 (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} B_2) R_0^{T-1} N_0^T == 0 \\
& -1 R_0 (R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{T-1} M_2^T - R^{T-1} B_2^T A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} M_2^T) - \\
& R^{T-1} B_2^T A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} M_2^T) - ((B_2^T A_{22}^{T-1} A_{22}^{T-1} M_2^T - R_0 R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{T-1} M_2^T) N_0 - \\
& N_0^T M_2 A_{22}^{-1} A_{22}^{-1} B_2 + R_0 R^{T-1} N_0^T M_2 (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} B_2) R_0^{T-1} N_0^T + B_2^T A_{22}^{T-1} A_{22}^{T-1} M_2^T - \\
& B_2^T A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} M_2^T == 0
\end{aligned}$$

The expressions with unknown variables $\{k_{30}, A_{22}^{-1}, (A_{22} + B_2 G_2)^{-1}, A_{22}^{T-1}, A_{12}, R^{T-1}, M_2^T, M_2, B_2^T, B_1\}$

and knowns $\{B_0, N_0^T\}$

$$\begin{aligned}
& -1 B_0 (R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{T-1} k_{30} - R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{T-1} M_2^T M_2 (A_{22} + B_2 G_2)^{-1} (A_{22} + B_2 G_2)^{-1}) - \\
& R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{T-1} M_2^T M_2 (A_{22} + B_2 G_2)^{-1} (A_{22} + B_2 G_2)^{-1} + \\
& R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{T-1} A_{22}^{T-1} M_2^T M_2 (A_{22} + B_2 G_2)^{-1} - \\
& A_{12} A_{22}^{-1} (A_{22} + B_2 G_2)^{-1} (A_{22} + B_2 G_2)^{-1} + \\
& A_{12} (A_{22} + B_2 G_2)^{-1} (A_{22} + B_2 G_2)^{-1} (A_{22} + B_2 G_2)^{-1} + (B_0 R^{T-1} - \\
& B_1 R^{T-1}) N_0^T M_2 (A_{22} + B_2 G_2)^{-1} (A_{22} + B_2 G_2)^{-1} (A_{22} + B_2 G_2)^{-1} + \\
& B_1 R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{T-1} A_{22}^{T-1} k_{30} - \\
& B_1 R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{T-1} M_2^T M_2 (A_{22} + B_2 G_2)^{-1} (A_{22} + B_2 G_2)^{-1} + \\
& B_1 R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{T-1} A_{22}^{T-1} M_2^T M_2 (A_{22} + B_2 G_2)^{-1} == 0
\end{aligned}$$

The expressions with unknown variables $\{A_{22}^{-1}, (A_{22} + B_2 G_2)^{-1}, A_{22}^T, A_{22}^{T-1}, (A_{22} + B_2 G_2)^{T-1}, R^{T-1}, M_2^T, M_2, B_2^T, B_2\}$

and knowns $\{N_0, R_0, N_0^T, R_0^{T-1}\}$

$$\begin{aligned}
& N_0 (R^{T-1} B_2^T A_{22}^{T-1} - R^{T-1} B_2^T A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} A_{22}^T - \\
& R^{T-1} N_0^T M_2 (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} B_2 R_0^{T-1} B_2^T) + (M_2 A_{22}^{-1} A_{22}^{-1} B_2 - \\
& M_2 (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} B_2 + N_0 R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{T-1} M_2^T N_0) R_0^{T-1} B_2^T == 0 \\
& R_0 (R^{T-1} B_2^T A_{22}^{T-1} - R^{T-1} B_2^T A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} A_{22}^T) - B_2^T A_{22}^{T-1} - ((B_2^T A_{22}^{T-1} A_{22}^{T-1} M_2^T - \\
& R_0 R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{T-1} M_2^T) N_0 - N_0^T M_2 A_{22}^{-1} A_{22}^{-1} B_2) + \\
& R_0 R^{T-1} N_0^T M_2 (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} B_2) R_0^{T-1} B_2^T + B_2^T A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} A_{22}^T == 0
\end{aligned}$$

The expressions with unknown variables $\{A_{22}^{-1}, (A_{22} + B_2 G_2)^{-1}, A_{22}^{T-1}, (A_{22} + B_2 G_2)^{T-1}, A_{12}, R^{T-1}, M_2, B_2^T, B_2, B_1\}$

and knowns $\{B_0, N_0^T, R_0^{T-1}\}$

$$\begin{aligned}
& -1 (A_{12} A_{22}^{-1} A_{22}^{-1} B_2 - A_{12} (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} B_2) R_0^{T-1} B_2^T A_{22}^{T-1} + \\
& A_{12} A_{22}^{-1} (A_{22} + B_2 G_2)^{-1} B_2 R^{T-1} B_2^T (A_{22} + B_2 G_2)^{T-1} - \\
& A_{12} (A_{22} + B_2 G_2)^{-1} (A_{22} + B_2 G_2)^{-1} B_2 R^{T-1} B_2^T (A_{22} + B_2 G_2)^{T-1} + (B_0 R^{T-1} - \\
& B_1 R^{T-1}) N_0^T M_2 (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} B_2 R_0^{T-1} B_2^T A_{22}^{T-1} - (B_0 R^{T-1} - \\
& B_1 R^{T-1}) N_0^T M_2 (A_{22} + B_2 G_2)^{-1} (A_{22} + B_2 G_2)^{-1} B_2 R^{T-1} B_2^T (A_{22} + B_2 G_2)^{T-1} == 0
\end{aligned}$$

The expressions with unknown variables $\{A_{22}^{-1}, (A_{22} + B_2 G_2)^{-1}, A_{22}^{T-1}, (A_{22} + B_2 G_2)^{T-1}, A_{22}, R^{T-1}, M_2^T, M_2, B_2^T, B_2\}$

and knowns $\{N_0, N_0^T, R_0^{T-1}\}$

$$\begin{aligned}
& (A_{22}^{-1} B_2 - A_{22} (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} B_2 - B_2 R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{T-1} M_2^T N_0) R_0^{T-1} - A_{22}^{-1} B_2 R^{T-1} + \\
& A_{22} (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} B_2 R^{T-1} + B_2 R^{T-1} B_2^T A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} M_2^T N_0 R^{T-1} - \\
& B_2 R^{T-1} N_0^T M_2 (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} B_2 R^{T-1} + \\
& B_2 R^{T-1} N_0^T M_2 (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} B_2 R_0^{T-1} == 0 \\
& -1 (A_{22}^{-1} B_2 - A_{22} (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} B_2 - B_2 R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{T-1} M_2^T N_0) + \\
& B_2 R^{T-1} N_0^T M_2 (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} B_2) R_0^{T-1} N_0^T - B_2 R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{T-1} M_2^T + \\
& B_2 R^{T-1} B_2^T A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} M_2^T == 0
\end{aligned}$$

The expressions with unknown variables $\{k_{30}, A_{22}^{-1}, (A_{22} + B_2 G_2)^{-1}, A_{22}^{T-1}, (A_{22} + B_2 G_2)^{T-1}, A_{12}, R^{T-1}, M_2^T, M_2, B_2^T, B_1\}$
and knowns $\{B_0, N_0^T\}$

$$\begin{aligned}
& -1 B_0 (R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} k_{30} && - \\
& R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{T-1} M_2^T M_2 (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} && + \\
& R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} M_2^T M_2 A_{22}^{-1} && - \\
& A_{12} (A_{22} + B_2 G_2)^{-1} (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} && + \\
& A_{12} A_{22}^{-1} (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} && - \\
& (B_0 R^{T-1} && + \\
& B_1 R^{T-1}) N_0^T M_2 (A_{22} + B_2 G_2)^{-1} (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} && - \\
& B_1 R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} k_{30} && + \\
& B_1 R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{T-1} M_2^T M_2 (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} && - \\
& B_1 R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} M_2^T M_2 A_{22}^{-1} == 0 && + \\
& -1 B_0 (R^{T-1} B_2^T A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} A_{22}^{T-1} k_{30} && - \\
& R^{T-1} B_2^T A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} M_2^T M_2 A_{22}^{-1} (A_{22} + B_2 G_2)^{-1} && + \\
& R^{T-1} B_2^T A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} A_{22}^{T-1} M_2^T M_2 (A_{22} + B_2 G_2)^{-1} && - \\
& A_{12} A_{22}^{-1} A_{22}^{-1} (A_{22} + B_2 G_2)^{-1} + A_{12} (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} (A_{22} + B_2 G_2)^{-1} + (B_0 R^{T-1} && - \\
& B_1 R^{T-1}) N_0^T M_2 (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} (A_{22} + B_2 G_2)^{-1} && + \\
& B_1 R^{T-1} B_2^T A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} A_{22}^{T-1} k_{30} && - \\
& B_1 R^{T-1} B_2^T A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} M_2^T M_2 A_{22}^{-1} (A_{22} + B_2 G_2)^{-1} && + \\
& B_1 R^{T-1} B_2^T A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} A_{22}^{T-1} M_2^T M_2 (A_{22} + B_2 G_2)^{-1} == 0 && - \\
& -1 B_0 (R^{T-1} B_2^T A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} (A_{22} + B_2 G_2)^{T-1} k_{30} && - \\
& R^{T-1} B_2^T A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} M_2^T M_2 A_{22}^{-1} A_{22}^{-1} && + \\
& R^{T-1} B_2^T A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} (A_{22} + B_2 G_2)^{T-1} M_2^T M_2 A_{22}^{-1} && + \\
& A_{12} (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} A_{22}^{-1} + (B_0 R^{T-1} - B_1 R^{T-1}) N_0^T M_2 (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} A_{22}^{-1} && + \\
& B_1 R^{T-1} B_2^T A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} (A_{22} + B_2 G_2)^{T-1} k_{30} && - \\
& B_1 R^{T-1} B_2^T A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} M_2^T M_2 A_{22}^{-1} A_{22}^{-1} && + \\
& B_1 R^{T-1} B_2^T A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} (A_{22} + B_2 G_2)^{T-1} M_2^T M_2 A_{22}^{-1} == 0 && +
\end{aligned}$$

The expressions with unknown variables $\{k_{30}, A_{22}^{-1}, (A_{22} + B_2 G_2)^{-1}, A_{22}^{T-1}, (A_{22} + B_2 G_2)^{T-1}, A_{22}, R^{T-1}, M_2^T, M_2, B_2^T, B_2\}$
and knowns $\{N_0^T\}$

$$\begin{aligned}
& B_2 R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} k_{30} && \rightarrow \\
& (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} && - \\
& A_{22} (A_{22} + B_2 G_2)^{-1} (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} && + \\
& B_2 R^{T-1} N_0^T M_2 (A_{22} + B_2 G_2)^{-1} (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} && + \\
& B_2 R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{T-1} M_2^T M_2 (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} && - \\
& B_2 R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} M_2^T M_2 A_{22}^{-1} && - \\
& B_2 R^{T-1} B_2^T A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} A_{22}^{T-1} k_{30} && \rightarrow \\
& A_{22}^{-1} (A_{22} + B_2 G_2)^{-1} && - \\
& A_{22} (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} (A_{22} + B_2 G_2)^{-1} && + \\
& B_2 R^{T-1} N_0^T M_2 (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} (A_{22} + B_2 G_2)^{-1} && + \\
& B_2 R^{T-1} B_2^T A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} M_2^T M_2 A_{22}^{-1} (A_{22} + B_2 G_2)^{-1} && - \\
& B_2 R^{T-1} B_2^T A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} A_{22}^{T-1} M_2^T M_2 (A_{22} + B_2 G_2)^{-1} && - \\
& B_2 R^{T-1} B_2^T A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} (A_{22} + B_2 G_2)^{T-1} k_{30} && \rightarrow \\
& A_{22}^{-1} A_{22}^{-1} - A_{22} (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} A_{22}^{-1} + B_2 R^{T-1} N_0^T M_2 (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} A_{22}^{-1} && + \\
& B_2 R^{T-1} B_2^T A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} M_2^T M_2 A_{22}^{-1} A_{22}^{-1} && - \\
& B_2 R^{T-1} B_2^T A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} (A_{22} + B_2 G_2)^{T-1} M_2^T M_2 A_{22}^{-1} && -
\end{aligned}$$

The expressions with unknown variables $\{A_{22}^{-1}, (A_{22} + B_2 G_2)^{-1}, A_{22}^T, A_{22}^{T-1}, (A_{22} + B_2 G_2)^{T-1}, A_{22}, R^{T-1}, M_2^T, M_2, B_2^T, B_2\}$

and knows $\{N_0, N_0^T, R_0^{T-1}\}$

$$\begin{aligned}
& -1(A_{22}^{-1} B_2 \\
& A_{22} (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} B_2 - B_2 R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{-1} M_2^T N_0) R_0^{T-1} B_2^T + B_2 R^{T-1} B_2^T A_{22}^{T-1} - \\
& B_2 R^{T-1} B_2^T A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} A_{22}^{-1} B_2 - B_2 R^{T-1} N_0^T M_2 (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} B_2 R_0^{T-1} B_2^T == \\
& 0
\end{aligned}$$

The expressions with unknown variables $\{A_{22}^{-1}, (A_{22} + B_2 G_2)^{-1}, A_{22}^{T-1}, (A_{22} + B_2 G_2)^{T-1}, A_{12}, R^{T-1}, M_2^T, M_2, B_2^T, B_2, B_1\}$

and knows $\{B_0, N_0, N_0^T, R_0^{T-1}\}$

$$\begin{aligned}
& ((B_0 R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{-1} M_2^T - B_1 R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{-1} M_2^T) N_0 + A_{12} A_{22}^{-1} A_{22}^{-1} B_2 - \\
& A_{12} (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} B_2) R_0^{T-1} - A_{12} A_{22}^{-1} A_{22}^{-1} B_2 R^{T-1} + A_{12} (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} B_2 R^{T-1} + \\
& (B_0 R^{T-1} - B_1 R^{T-1}) N_0^T M_2 (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} B_2 R^{T-1} - (B_0 R^{T-1} - \\
& B_1 R^{T-1}) N_0^T M_2 (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} B_2 R_0^{T-1} - \\
& B_0 R^{T-1} B_2^T A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} M_2^T N_0 R^{T-1} + \\
& B_1 R^{T-1} B_2^T A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} M_2^T N_0 R^{T-1} == 0
\end{aligned}$$

$$\begin{aligned}
& B_0 (R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{-1} M_2^T - R^{T-1} B_2^T A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} M_2^T) \\
& ((B_0 R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{-1} M_2^T - B_1 R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{-1} M_2^T) N_0 + A_{12} A_{22}^{-1} A_{22}^{-1} B_2 - \\
& A_{12} (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} B_2 - (B_0 R^{T-1} - B_1 R^{T-1}) N_0^T M_2 (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} B_2) R_0^{T-1} N_0^T - \\
& B_1 R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{-1} M_2^T + B_1 R^{T-1} B_2^T A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} M_2^T == 0
\end{aligned}$$

The expressions with unknown variables $\{A_{22}^{-1}, (A_{22} + B_2 G_2)^{-1}, A_{22}^{T-1}, (A_{22} + B_2 G_2)^{T-1}, A_{12}, R^{T-1}, M_2^T, M_2, B_2^T, B_2, B_1\}$

and knows $\{N_0, R_0, B_0^T, N_0^T, R_0^{T-1}\}$

$$\begin{aligned}
& N_0 (R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{-1} A_{12}^T - R^{T-1} B_2^T A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} A_{12}^T) \\
& R^{T-1} N_0^T M_2 (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} B_2 R_0^{T-1} B_1^T) \\
& (N_0 (R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{-1} M_2^T N_0 - R^{T-1} N_0^T M_2 (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} B_2) + M_2 A_{22}^{-1} A_{22}^{-1} B_2 - \\
& M_2 (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} B_2) R_0^{T-1} B_0^T + (M_2 A_{22}^{-1} A_{22}^{-1} B_2 - M_2 (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} B_2 + \\
& N_0 R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{-1} M_2^T N_0) R_0^{T-1} B_1^T == 0
\end{aligned}$$

$$\begin{aligned}
& R_0 (R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{-1} A_{12}^T \\
& R^{T-1} B_2^T A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} A_{12}^T) + ((B_2^T A_{22}^{T-1} A_{22}^{-1} M_2^T - R_0 R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{-1} M_2^T) N_0 - \\
& N_0^T M_2 A_{22}^{-1} A_{22}^{-1} B_2 + R_0 R^{T-1} N_0^T M_2 (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} B_2) R_0^{T-1} (B_0^T - B_1^T) - \\
& B_2^T A_{22}^{T-1} A_{22}^{-1} A_{12}^T + B_2^T A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} A_{12}^T == 0
\end{aligned}$$

The expressions with unknown variables $\{A_{22}^{-1}, (A_{22} + B_2 G_2)^{-1}, A_{22}^T, A_{22}^{T-1}, (A_{22} + B_2 G_2)^{T-1}, A_{12}, R^{T-1}, M_2^T, M_2, B_2^T, B_2, B_1\}$

and knows $\{B_0, N_0, N_0^T, R_0^{T-1}\}$

$$\begin{aligned}
& -1 B_0 (R^{T-1} B_2^T A_{22}^{T-1} - R^{T-1} B_2^T A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} A_{22}^T) - ((B_0 R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{-1} M_2^T - \\
& B_1 R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{-1} M_2^T) N_0 + A_{12} A_{22}^{-1} A_{22}^{-1} B_2 - A_{12} (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} B_2) R_0^{T-1} B_2^T + \\
& B_1 R^{T-1} B_2^T A_{22}^{T-1} - B_1 R^{T-1} B_2^T A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} A_{22}^T + (B_0 R^{T-1} - \\
& B_1 R^{T-1}) N_0^T M_2 (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} B_2 R_0^{T-1} B_2^T == 0
\end{aligned}$$

The expressions with unknown variables $\{A_{22}^{-1}, (A_{22} + B_2 G_2)^{-1}, A_{22}^{T-1}, (A_{22} + B_2 G_2)^{T-1}, A_{22}, A_{12}, R^{T-1}, M_2^T, M_2, B_2^T, B_2, B_1\}$

and knows $\{N_0, B_0^T, N_0^T, R_0^{T-1}\}$

$$\begin{aligned}
& -1(A_{22}^{-1} B_2 - A_{22} (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} B_2 - B_2 R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{-1} M_2^T N_0) R_0^{T-1} B_1^T + (A_{22}^{-1} B_2 - \\
& A_{22} (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} B_2 - B_2 R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{-1} M_2^T N_0) \\
& B_2 R^{T-1} N_0^T M_2 (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} B_2) R_0^{T-1} B_0^T + B_2 R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{-1} A_{12}^T - \\
& B_2 R^{T-1} B_2^T A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} A_{12}^T - B_2 R^{T-1} N_0^T M_2 (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} B_2 R_0^{T-1} B_1^T == \\
& 0
\end{aligned}$$

The expressions with unknown variables $\{A_{22}^{-1}, (A_{22} + B_2 G_2)^{-1}, A_{22}^{T-1}, (A_{22} + B_2 G_2)^{T-1}, A_{12}, R^{T-1}, M_2^T, M_2, B_2^T, B_2, B_1, B_1\}$

and knows $\{B_0, N_0, B_0^T, N_0^T, R_0^{T-1}\}$

$$\begin{aligned}
& -1 B_0 (R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{T-1} A_{12}^T - R^{T-1} B_2^T A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} A_{12}^T) - \\
& ((B_0 R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{T-1} M_2^T) N_0 + A_{12} A_{22}^{-1} A_{22}^{-1} B_2 - A_{12} (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} B_2) R_0^{T-1} B_1^T + \\
& ((B_0 R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{T-1} M_2^T - B_1 R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{T-1} M_2^T) N_0 + A_{12} A_{22}^{-1} A_{22}^{-1} B_2 - \\
& A_{12} (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} B_2 - (B_0 R^{T-1} - B_1 R^{T-1}) N_0^T M_2 (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} B_2) R_0^{T-1} B_0^T + \\
& B_1 R^{T-1} B_2^T A_{22}^{T-1} A_{22}^{T-1} A_{12}^T - B_1 R^{T-1} B_2^T A_{22}^{T-1} (A_{22} + B_2 G_2)^{T-1} A_{12}^T + (B_0 R^{T-1} - \\
& B_1 R^{T-1}) N_0^T M_2 (A_{22} + B_2 G_2)^{-1} A_{22}^{-1} B_2 R_0^{T-1} B_1^T == 0
\end{aligned}$$

The time for preliminaries was 0:00:09

The time for NCMakeGB 1 was 0:00:00

The time for Remove Redundant 1 was 0:00:04

The time for the main NCMakeGB was 0:01:38

The time for Remove Redundant 2 was 0:00:04

The time for reducing unknowns was 0:00:03

The time for clean up basis was 0:00:09

The time for SmallBasis was 0:00:12

The time for CreateCategories was 0:01:18

The time for NCCV was 0:02:29

The time for RegularOutput was 0:05:48

The time for everything so far was 0:12:06