```
shap[] := shapval /. ps

shapval = {1/3 + (-2*b1 + b2 + b3)/6, 1/3 + (b1 - 2*b2 + b3)/6,
     1/3 + (b1 + b2 - 2*b3)/6}

xtrap[xa_, xb_] := Module[{s}, Clear[S01, S02, r]; S01 = xa; S02 = xb;
     s = preparedforxtrap; Return[s]; ]

gg[X_] := fsb[bf[X]]

bf[r_] := Module[{xo}, xo = S01 + r*(S02 - S01); Return[xo]; ]

fsb[z_] := sbx[f, z]

sbx[phi_, sxa_] := Module[{xaa, r}, xaa = sb[sxa]; r = phi /. xaa; Return[r];
     Null; ]

sb[wq_] := s42b[wq]

s42b[w_] := Module[{j1, j2, j3, a, j4, j5, j6, j7, j8, j9, j10, j11, j12,
     j13, j14, j15, j16, j17, j18, j19, j20, j21, j22, j23, j24, j25, j26,
     j27, j28, j29, j30, j31, j32, j33, j34, j35, j36, j37, j38, j39, j40,
     j41, j42}, {j1, j2, j3, j4, j5, j6, j7, j8, j9, j10, j11, j12, j13,
        j14, j15, j16, j17, j18, j19, j20, j21, j22, j23, j24, j25, j26, j27,
        j28, j29, j30, j31, j32, j33, j34, j35, j36, j37, j38, j39, j40, j41,
        j42} = w; a = {x1 -> j1, x2 -> j2, x3 -> j3, x4 -> j4, x5 -> j5,
        x6 -> j6, x7 -> j7, x8 -> j8, x9 -> j9, x10 -> j10, x11 -> j11,
        x12 -> j12, x13 -> j13, x14 -> j14, x15 -> j15, x16 -> j16,
        x17 -> j17, x18 -> j18, x19 -> j19, x20 -> j20, x21 -> j21,
        x22 -> j22, x23 -> j23, x24 -> j24, x25 -> j25, x26 -> j26,
        x27 -> j27, x28 -> j28, x29 -> j29, x30 -> j30, x31 -> j31,
        x32 -> j32, x33 -> j33, x34 -> j34, x35 -> j35, x36 -> j36,
        x37 -> j37, x38 -> j38, x39 -> j39, x40 -> j40, x41 -> j41,
        x42 -> j42}; Return[a]; ]

rrceb[v1_, v2_, v3_, v4_] := Module[{r}, Clear[s, t1, t2, u]; t1 = dat[];
     s = {v2, v3, v4}; u = $rrceb$; Save["start.data.gen", memo, u, s, t1];
     r = rrc[v1, v2, v3, v4]; Clear[OUT]; OUT = r; t2 = dat[];
     Save["out.rrceb", ps, memo, OUT, s, t1, t2]; Return[r]; ]

dat[] := Module[{r, t1, t2, t3, t4, t5, t6},
     {t1, t2, t3, t4, t5, t6} = Date[]; r = {t3, t2, t1, t4, t5}; Return[r]; ]

rrc[z1_, z2_, z3_, z4_] := rrb[f, z1, z2, z3, z4]

rrb[f_, sx_, a_, m_Integer, n_Integer] := Module[{na, w, zx},
     If[n < 1, Return[no$$iterations$$error]]; na = 0; zx = rat[sx, m];
     Label[o1]; If[na == n, Goto[o2]]; zx = rfb[f, zx, a, m]; na = na + 1;
     Goto[o1]; Label[o2]; Return[zx]; ]

rat[x_, k_Integer] := Rationalize[x, 1/10^(k + 2)]

rfb[f_, sx_, a_, n_Integer] := rf1b[f, rat[sx, n], a, n]
```

```
rf1b[f_, sx_, a_, n_Integer] := (AccuracyGoal -> n; PrecisionGoal -> n;
    WorkingPrecision -> n + 7; Module[{u, zx, du, b, fe, fe2, st42, st43},
     b = a; st43 = N[sbx[{{D[f, x1], D[f, x2], D[f, x3], D[f, x4], D[f, x5],
            D[f, x6], D[f, x7], D[f, x8], D[f, x9], D[f, x10], D[f, x11],
            D[f, x12], D[f, x13], D[f, x14], D[f, x15], D[f, x16], D[f, x17],
            D[f, x18], D[f, x19], D[f, x20], D[f, x21], D[f, x22], D[f, x23],
            D[f, x24], D[f, x25], D[f, x26], D[f, x27], D[f, x28], D[f, x29],
            D[f, x30], D[f, x31], D[f, x32], D[f, x33], D[f, x34], D[f, x35],
            D[f, x36], D[f, x37], D[f, x38], D[f, x39], D[f, x40], D[f, x41],
            D[f, x42]}, f}, sx], n]; st43 = Rationalize[st43, 1/10^(n + 2)];
      {st42, fe} = st43; du = st42 . st42; u = -(fe/du); Goto[o2];
      Label[o1]; b = (2*b)/3; Label[o2]; zx = N[sx + b*u*st42, n];
      fe2 = N[sbx[f, zx], n]; If[fe2 < fe, Goto[o3]];
      If[b < 6^(-n), Return[gonetoosmall]]; Goto[o1]; Label[o3]; Return[zx];
      Null; ])

rrffreb[v1_, v2_, v3_, v4_, v5_, v6_] :=
    Module[{r}, Clear[s, t1, t2, u]; t1 = dat[]; s = {v2, v3, v4, v5, v6};
      u = $rrffreb$; Save["start.data.gen", memo, u, s, t1];
      r = rrffr[v1, v2, v3, v4, v5, v6]; Clear[OUT]; OUT = r; t2 = dat[];
      Save["out.rrffreb", ps, memo, OUT, s, t1, t2]; Return[r]; ]

rrffr[sx_, a_, b_Integer, c_Integer, n_Integer, M_Integer] :=
    Module[{na, zx}, If[n < 1, Return[no$iterations$error]]; precon[];
      na = 0; zx = rat[sx, b]; Label[o1]; If[na == M, Goto[o2]];
      zx = rrffa[rat[zx, b], a, b, c, n]; na = na + 1; Goto[o1]; Label[o2];
      Return[zx]; ]

precon[] := Module[{aa}, Clear[L1, L2, L3, L4, L5, L6, L7, L8, L9, L10, L12,
       L13, L14, L15, L16, L17, L18, L19, L20, L21, L22, L23, L24, L25, L26,
       L27, L28, L29, L30, L31, L32, L33, L34, L35, L36, L37, L38, L39, L40,
       L41, L42, L43, L44]; L1 = D[f, x1]; L2 = D[f, x2]; L3 = D[f, x3];
      L4 = D[f, x4]; L5 = D[f, x5]; L6 = D[f, x6]; L7 = D[f, x7];
      L8 = D[f, x8]; L9 = D[f, x9]; L10 = D[f, x10]; L11 = D[f, x11];
      L12 = D[f, x12]; L13 = D[f, x13]; L14 = D[f, x14]; L15 = D[f, x15];
      L16 = D[f, x16]; L17 = D[f, x17]; L18 = D[f, x18]; L19 = D[f, x19];
      L20 = D[f, x20]; L21 = D[f, x21]; L22 = D[f, x22]; L23 = D[f, x23];
      L24 = D[f, x24]; L25 = D[f, x25]; L26 = D[f, x26]; L27 = D[f, x27];
      L28 = D[f, x28]; L29 = D[f, x29]; L30 = D[f, x30]; L31 = D[f, x31];
      L32 = D[f, x32]; L33 = D[f, x33]; L34 = D[f, x34]; L35 = D[f, x35];
      L36 = D[f, x36]; L37 = D[f, x37]; L38 = D[f, x38]; L39 = D[f, x39];
      L40 = D[f, x40]; L41 = D[f, x41]; L42 = D[f, x42]; ]

rrffa[vx_, a_, b_Integer, c_Integer, n_Integer] :=
    Module[{r}, r = rre[FRTC[rre[vx, a, b, c], n], a, b, c]; Return[r]; ]

rre[sx_, a_, m_Integer, n_Integer] := Module[{na, w, zx},
     If[n < 1, Return[no$iterations$error]]; na = 0; zx = rat[sx, m];
      Label[o1]; If[na == n, Goto[o2]]; zx = rf1cb[rat[zx, m], a, m];
      na = na + 1; Goto[o1]; Label[o2]; Return[zx]; ]

rf1cb[sx_, a_, n_Integer] := (AccuracyGoal -> n; PrecisionGoal -> n;
    WorkingPrecision -> n + 7; Module[{u, zx, du, b, fe, fe2, st42, st43},
     b = a; st43 = N[sbx[{{L1, L2, L3, L4, L5, L6, L7, L8, L9, L10, L11,
            L12, L13, L14, L15, L16, L17, L18, L19, L20, L21, L22, L23, L24,
```

```
                L25, L26, L27, L28, L29, L30, L31, L32, L33, L34, L35, L36, L37,
                L38, L39, L40, L41, L42}, f}, sx], n];
          st43 = Rationalize[st43, 1/10^(n + 2)]; {st42, fe} = st43;
          du = st42 . st42; u = -(fe/du); Goto[o2]; Label[o1]; b = (2*b)/3;
          Label[o2]; zx = N[sx + b*u*st42, n]; fe2 = N[sbx[f, zx], n];
          If[fe2 < fe, Goto[o3]]; If[b < 6^(-n), Return[gonetoosmall]];
          Goto[o1]; Label[o3]; Return[zx]; Null; ])

FRTC[u1_, u2_] := FRTB[ff, u1, u2]

FRTB[w1_, w2_, w3_] := Module[{zx, o}, o = FRTA[w1, w2, w3]; zx = xx42 /. o;
      Return[zx]; ]

FRTA[ll_, sx_, n_Integer] := Module[{rx, o, x1a, x2a, x3a, x4a, x5a, x6a,
      x7a, x8a, x9a, x10a, x11a, x12a, x13a, x14a, x15a, x16a, x17a, x18a,
      x19a, x20a, x21a, x22a, x23a, x24a, x25a, x26a, x27a, x28a, x29a, x30a,
      x31a, x32a, x33a, x34a, x35a, x36a, x37a, x38a, x39a, x40a, x41a,
      x42a}, rx = Rationalize[sx, 1/10^(n + 2)];
      {x1a, x2a, x3a, x4a, x5a, x6a, x7a, x8a, x9a, x10a, x11a, x12a, x13a,
        x14a, x15a, x16a, x17a, x18a, x19a, x20a, x21a, x22a, x23a, x24a,
        x25a, x26a, x27a, x28a, x29a, x30a, x31a, x32a, x33a, x34a, x35a,
        x36a, x37a, x38a, x39a, x40a, x41a, x42a} = rx;
      o = FindRoot[ll == zz42, {x1, x1a}, {x2, x2a}, {x3, x3a}, {x4, x4a},
        {x5, x5a}, {x6, x6a}, {x7, x7a}, {x8, x8a}, {x9, x9a}, {x10, x10a},
        {x11, x11a}, {x12, x12a}, {x13, x13a}, {x14, x14a}, {x15, x15a},
        {x16, x16a}, {x17, x17a}, {x18, x18a}, {x19, x19a}, {x20, x20a},
        {x21, x21a}, {x22, x22a}, {x23, x23a}, {x24, x24a}, {x25, x25a},
        {x26, x26a}, {x27, x27a}, {x28, x28a}, {x29, x29a}, {x30, x30a},
        {x31, x31a}, {x32, x32a}, {x33, x33a}, {x34, x34a}, {x35, x35a},
        {x36, x36a}, {x37, x37a}, {x38, x38a}, {x39, x39a}, {x40, x40a},
        {x41, x41a}, {x42, x42a}, {AccuracyGoal -> n, WorkingPrecision ->
          n + 7}]; o = N[o, n]; Return[o]; ]

FRT[w1_, w2_, w3_] := Module[{za, zb, zc}, za = FRTA[w1, w2, w3];
      zb = FRTB[w1, w2, w3]; zc = {zb, za}; Return[zc]; ]

SFRC[u1_,u2_,u3_] := SFRB[ff,u1,u2,u3]

SFRB[w1_, w2_, w3_, v_] := Module[{zx, o}, o = SFRA[w1, w2, w3, v];
      zx = xx42 /. o; Return[zx]; ]

SFR[w1_, w2_, w3_, v_] := Module[{za, zb, zc}, za = SFRA[w1, w2, w3, v];
      zb = SFRB[w1, w2, w3, v]; zc = {zb, za}; Return[zc]; ]

zz42 = {0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
      0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0}

xx42 = {x1, x2, x3, x4, x5, x6, x7, x8, x9, x10, x11, x12, x13, x14, x15,
      x16, x17, x18, x19, x20, x21, x22, x23, x24, x25, x26, x27, x28, x29,
      x30, x31, x32, x33, x34, x35, x36, x37, x38, x39, x40, x41, x42}

rrdeb[v1_, v2_, v3_, v4_] := Module[{r}, Clear[s, t1, t2, u]; t1 = dat[];
      s = {v2, v3, v4}; u = $rrdeb$; Save["start.data.gen", memo, u, s, t1];
      r = rrd[v1, v2, v3, v4]; Clear[OUT]; OUT = r; t2 = dat[];
      Save["out.rrdeb", ps, memo, OUT, s, t1, t2]; Return[r]; ]
```

```
rrd[z1_, z2_, z3_, z4_] := rrca[f, z1, z2, z3, z4]

rrca[f_, sx_, a_, m_Integer, n_Integer] := Module[{na, w, zx},
     If[n < 1, Return[no$$iterations$$error]]; precon[]; na = 0;
      zx = rat[sx, m]; Label[o1]; If[na == n, Goto[o2]];
      zx = rfc[f, zx, a, m]; na = na + 1; Goto[o1]; Label[o2]; Return[zx]; ]

rfc[f_, sx_, a_, n_Integer] := rf1c[f, rat[sx, n], a, n]

rf1c[f_, sx_, a_, n_Integer] := (AccuracyGoal -> n; PrecisionGoal -> n;
     WorkingPrecision -> n + 7; Module[{u, zx, du, b, fe, fe2, st42, st43},
      b = a; st43 = N[sbx[{{L1, L2, L3, L4, L5, L6, L7, L8, L9, L10, L11,
            L12, L13, L14, L15, L16, L17, L18, L19, L20, L21, L22, L23, L24,
            L25, L26, L27, L28, L29, L30, L31, L32, L33, L34, L35, L36, L37,
            L38, L39, L40, L41, L42}, f}, sx], n];
        st43 = Rationalize[st43, 1/10^(n + 2)]; {st42, fe} = st43;
        du = st42 . st42; u = -(fe/du); Goto[o2]; Label[o1]; b = (2*b)/3;
        Label[o2]; zx = N[sx + b*u*st42, n]; fe2 = N[sbx[f, zx], n];
        If[fe2 < fe, Goto[o3]]; If[b < 6^(-n), Return[gonetoosmall]];
        Goto[o1]; Label[o3]; Return[zx]; Null; ])

ffsb[v_] := sbx[ff, v]

paytot[wx_] := s3sum[pay[wx]]

rp[Y_] := relpay[Y]

relpay[X_] := pay[X]/paytot[X]

s3sum[kk_] := Module[{r, f1, f2, f3}, {f1, f2, f3} = kk; r = f1 + f2 + f3;
     Return[r]; ]

pay[zx_] := sbx[ppvxx /. ps, zx]

prep[] := Module[{z}, Clear[done]; Clear[ff]; Clear[f]; ff = ff0 /. ps;
     f = ff . ff; Return[done]; ]

{File note: For the fully operational executive programs file there should
be included here the contents of the file "long.formulae.ppvxx.ff0.306".
That was taken out to obtain a shorter total file of executive programs
for Mathematica.)}

{Note that the algebraic formula files of ppvxx and ff0 are needed here.}

end = lastline
```