```
In[6]:= (* Content -type: application /vnd.wolfram .mathematica *)
    (*** Wolfram Notebook File ***)
    (* http://www.wolfram.com/nb *)
    (* CreatedBy ='Mathematica 11.3 ' *)
    (*CacheID : 234*)
    (* Internal cache information:
    NotebookFileLineBreakTest
    NotebookFileLineBreakTest
    NotebookDataPosition [ 158, 7]
    NotebookDataLength [ 7873, 245]
    NotebookOptionsPosition [ 7226,
                                             225]
    NotebookOutlinePosition [ 7570,
                                            240]
    CellTagsIndexPosition [ 7527, 237]
    WindowFrame ->Normal *)
    (* Beginning of Notebook Content *)
    Notebook [{
```

```
Cell[CellGroupData [{
Cell[BoxData [{
RowBox [{
RowBox [{"emptymat ", "=",
 RowBox [{"Table", "[",
 RowBox [{"0", ",",
  RowBox [{"{",
  RowBox[{"ic", ",", "1", ",", "7"}], "}"]], ",",
  RowBox [{"{",
  RowBox [{"jc", ",", "1", ",", "7"}], "}"}]]], "]"}])],
";"}], "
RowBox [{
RowBox [{"F", "=", "emptymat "}], ";"}], "
RowBox [{
RowBox [{
 RowBox [{"F", "[", "1", "]"}], "=",
 RowBox [{"{"},
 RowBox [{"0", ",", "\beta", ",",
  RowBox [{"h", " ", "\beta"}], ",",
  RowBox [{"i", " ", "\beta"}], ",", "\beta", ",",
  RowBox [{"j", " ", "\beta"}], ",", "\beta"}], "}"]]],
```

```
";"}], "
RowBox [{
RowBox [{"minusV ", "=", "emptymat "}], ";"}], "
RowBox [{
RowBox [{
RowBox [{"minusV", "[",
 {\tt RowBox} \ [\{"1",\ ",",\ "1"\}],\ "]"\}],\ "=",
FractionBox [
 RowBox [{"-", "1"}], "L"]}], ";"}], "
RowBox [{
RowBox [{
RowBox [{"minusV ", "[",
 RowBox [{"2", ",", "1"}], "]"}], "=",
FractionBox ["1", "L"]}], ";"}], "
RowBox [{
RowBox [{
RowBox [{"minusV ", "[",
 RowBox [{"2", ",", "2"}], "]"}], "=",
FractionBox [
```

```
RowBox [{"-", "1"}],
 RowBox [{"Cv", "-", "L"}]]}], ";"}], "
RowBox [{
RowBox [{
 RowBox [{"minusV ", "[",
 RowBox [{"3", ",", "2"}], "]"}], "=",
 RowBox [{
 FractionBox ["1",
 \label{eq:rowbox} \mbox{\tt RowBox} \ [\{"\mbox{\tt Cv", "-", "L"}\}], \ "f"\}]\}], \ ";"\}], \ "
RowBox [{
RowBox [{
 RowBox [{"minusV ", "[",
 RowBox [{"3", ",", "3"}], "]"}], "=",
 FractionBox [
 RowBox [{"-", "1"}],
 RowBox [{"Dv", "-", "Cv", "+", "L"}]]}], ";"}], "
RowBox [{
RowBox [{
RowBox [{"minusV ", "[",
 RowBox [{"4", ",", "2"}], "]"}], "=",
```

```
RowBox [{
 FractionBox ["1",
 RowBox [{"Cv", "-", "L"}]],
 RowBox [{"(",
 RowBox [{"1", "-", "f"}], ")"}], "q"}]], ";"}], "
RowBox [{
RowBox [{
{\tt RowBox}~\texttt{[{"minusV", "[",}}\\
RowBox [{"4", ",", "4"}], "]"}], "=",
FractionBox [
RowBox [{"-", "1"}],
 RowBox [{"Dv", "-", "Cv", "+", "L"}]]}], ";"}], "
RowBox [{
RowBox [{
RowBox [{"minusV ", "[",
 RowBox [{"5", ",", "2"}], "]", "=",
RowBox [{
 FractionBox ["1",
 RowBox [{"Cv", "-", "L"}]],
 RowBox [{"(",
 RowBox [{"1", "-", "f"}], ")"}], "tv"}]], ";"}], "
```

```
RowBox [{
RowBox [{
RowBox [{"minusV ", "[",
 RowBox [{"5", ",", "5"}], "]"}], "=",
FractionBox [
 RowBox [{"-", "1"}], "T"]}], ";"}], "
RowBox [{
RowBox [{
RowBox [{"minusV ", "[",
 RowBox [{"6", ",", "5"}], "\mathbb{I}"}], "=",
FractionBox ["1", "T"]}], ";"}], "
RowBox [{
RowBox [{
RowBox [{"minusV", "[",
 RowBox [{"6", ",", "6"}], "]"}], "=",
FractionBox [
 RowBox [{"-", "1"}],
 RowBox [{"Dv", "-", "Cv", "+", "L", "-", "T"}]]}],
";"}], "
```

```
RowBox [{
RowBox [{
{\tt RowBox}~\texttt{[{"minusV", "[",}}\\
 RowBox [{"7", ",", "2"}], "]"}], "=",
RowBox [{
 FractionBox ["1",
 RowBox [{"Cv", "-", "L"}]],
 RowBox [{"(",
 RowBox [{"1", "-", "f"}], ")"}],
 RowBox [{"(",
 RowBox [{"1", "-", "q", "-", "tv"}], ")"}]}]]],
";"}], "
RowBox [{
RowBox [{
{\tt RowBox}~\texttt{[{"minusV", "[",}}\\
 RowBox [{"7", ",", "7"}], "]"}], "=",
FractionBox [
 RowBox [{"-", "1"}],
 RowBox [{"Dv", "-", "Cv", "+", "L"}]]}], ";"}], "
RowBox [{
RowBox [{"V", "=",
```

```
RowBox [{"-", "minusV "}]}], ";"}], "
  RowBox [{"R0formula ", "=",
    RowBox [{
      RowBox [{
        RowBox [{"Eigenvalues ", "[",
          RowBox [{"F", ".",
            \label{lowBox [nowBox [nowBox [nowBox [nowBox [nowBox [nowBox nowBox n
        RowBox [{"-", "1"}], "]", "/",
      "FullSimplify "}]}]], "Input",
  CellChangeTimes -> {{3.7962109174135637`*^9 , 3.796210923937251*^9 }},
  CellLabel ->
    "In[2288]:=", ExpressionUUID -> "82fe846a -f9ff-40b2-93bb-1802 a630c7ae "],
Cell[BoxData[
  RowBox [{
    RowBox [{"(",
      RowBox [{
        RowBox [{
          RowBox [{"(",
            RowBox [{"Cv", "-", "L"}], ")"}], " ",
          RowBox [{"(",
```

```
RowBox [{"f", "-",
 RowBox [{"f", " ", "h"}], "+",
 RowBox [{
 RowBox [{"(",
  RowBox [{
  RowBox [{"-", "1"}], "+", "f"}], ")"}], " ",
 RowBox [{"(",
  RowBox [{
  RowBox [{"-", "1"}], "+", "i"}], ")"}], " ", "q"}]], ")"}]]], "+",
RowBox [{
RowBox [{"(",
RowBox [{
 RowBox [{"-", "1"}], "+", "f"}], ")"}], " ",
RowBox [{"(",
RowBox [{
 RowBox [{"-", "1"}], "+", "j"}], ")"}], " ",
RowBox [{"(",
RowBox [{"Cv", "-", "L", "+", "T"}], ")"}], " ", "tv"}], "+",
RowBox [{"Dv", " ",
RowBox [{"(",
RowBox [{"1", "+",
```

```
RowBox [{
               RowBox [{"(",
                 RowBox [{
                   RowBox [{"-", "1"}], "+", "i"}], ")"}], " ", "q"}], "+",
             RowBox [{
               RowBox [{"(",
                 RowBox [{
                   \label{eq:rowbox} \mbox{RowBox} \ [\{"-", \ "1"\}], \ "+", \ "j"\}], \ ")"\}], \ " \ ", \ "tv"\}], \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+", \ "+
              RowBox [{"f", " ",
               RowBox [{"(",
                 RowBox [{
                   {\tt RowBox} \ [\{"-",\ "1"\}],\ "+",\ "h",\ "+",\ "q",\ "-",
                   RowBox [{"i", " ", "q"}], "+", "tv", "-",
                   RowBox [{"j", " ", "tv"}]}], ")"}]}]], ")"}], " ",
    "\beta"}]], "Output ",
   CellChangeTimes -> {{3.7962109245403233`*^9 , 3.7962109478256917`*^9 },
     3.796210983592808*^9 },
  CellLabel ->
    "Out[2306]=", ExpressionUUID -> "98650565 -ac96-4d33-a468-2323e7149ee9"]
}, Open ]],
Cell[CellGroupData [{
```

```
Cell[BoxData[
RowBox [{"TeXForm ", "[",
 RowBox [{"R0formula ", "/", "\beta"}], "]"}]], "Input",
CellChangeTimes -> {{3.7962109613003693`*^9 , 3.796210970717222*^9 }},
CellLabel ->
 "In[2307]:=", ExpressionUUID -> "859 c1870 -10 b0 -4462 -9957 -944 cc4072d8b"],
Cell["\n(\text{Cv}-L) (f (-h)+(f-1) (i-1) q+f)+(f-1) (j-1)
         \t \{tv\} \n(\t \{Cv\}-L+T)+\t \{Dv\} \ (f\n\n \ q-j \ \}
         \t \{tv\}+q+\t \{tv\}-1\}+(i-1) q+(j-1) \t \{tv\}+1\}\n", "Output ",
CellChangeTimes -> {{3.796210971989303*^9 , 3.7962109875381937`*^9 }},
CellLabel ->
 "Out[2307]//TeXForm =", ExpressionUUID -> "e129684e -d062-4414-8f76- c45e84642a59 "]
}, Open ]]
},
WindowSize -> {734, 621},
WindowMargins -> {{Automatic, 139}, {-10, Automatic}},
FrontEndVersion -> "11.3 for Microsoft Windows (64-bit) (March 6, 2018)",
StyleDefinitions -> "Default .nb"
1
(* End of Notebook Content *)
```

```
(* Internal cache information *)
(*CellTagsOutline
CellTagsIndex ->{}
*)
(*CellTagsIndex
CellTagsIndex ->{}
*)
(*NotebookFileOutline
Notebook [{
Cell[CellGroupData [{
Cell[580, 22, 4508, 131, 593, "Input",
        ExpressionUUID -> "82 fe846a - f9ff - 40 b2 - 93 bb - 1802 a630c7ae "],
Cell[5091, 155, 1479, 47, 52, "Output",
        ExpressionUUID ->"98650565 -ac96-4d33-a468-2323 e7149ee9 "]
}, Open ]],
Cell[CellGroupData [{
Cell[6607, 207, 249, 5, 28, "Input",
        ExpressionUUID ->"859 c1870 -10b0-4462 -9957 -944 cc4072d8b"],
Cell[6859, 214, 351, 8, 62, "Output",
        ExpressionUUID ->"e129684e -d062-4414-8f76-c45e84642a59 "]
}, Open ]]
}
]
```

\*)

```
(* End of internal cache information *)
```

```
Out[6]=
     Notebook [
        {Cell[CellGroupData [{Cell[BoxData [{RowBox [{RowBox [{emptymat , = , RowBox [{Table , [ , RowBox [
                             {0, ,, RowBox [{{, RowBox [{ic, ,, 1, ,, 7}], }}], ,,
                               RowBox [\{\{, RowBox [\{jc, ,, 1, ,, 7\}], \}\}]\}], [\}]\}], ;\}],
                       RowBox [{RowBox [{F, =, emptymat }], ;}],
                      , RowBox [{RowBox [{F, \mathbb{I}, 1, \mathbb{I}}], =, RowBox [{{, RowBox [{0, ,, \beta, ,, RowBox [{h, ,, }
                                 \beta], ,, RowBox [{i, , \beta}], ,, \beta, ,, RowBox [{j, , \beta}], ,, \beta}], }}]]], ;}],
                      , RowBox [{RowBox [{minusV , =, emptymat }], ;}],
                      , RowBox [{RowBox [{minusV, [], RowBox [{1, ,, 1}], []}]},
                         =, FractionBox [RowBox [{-, 1}], L]]], ;}],
                      , RowBox [{RowBox [{minusV, [], RowBox [{2, ,, 1}], []}]},
                         =, FractionBox [1, L]}], ;}],
                      , RowBox [\{RowBox [\{minusV, [, RowBox [\{2, ,, 2\}], ]\}]\}]
                         =, FractionBox [RowBox [{-, 1}], RowBox [{Cv, -, L}]]}], ;}],
                      , RowBox [\{RowBox [\{RowBox [\{minusV, [, RowBox [\{3, ,, 2\}], ]\}\}],
                         =, RowBox [{FractionBox [1, RowBox [{Cv, -, L}]], f}]], ;}],
                      , RowBox [\{RowBox [\{minusV, [, RowBox [\{3, ,, 3\}], ]\}]\}]
                         =, FractionBox [RowBox [{-, 1}], RowBox [{Dv, -, Cv, +, L}]]]], ;}],
                      , RowBox [{RowBox [{RowBox [{minusV}, [ ], RowBox [{4, ,, 2}], [ ]}], =, RowBox [
                          {FractionBox [1, RowBox [(Cv, -, L)]], RowBox [((, RowBox [(1, -, f)], ))], q)])], ;)],
                      , RowBox [\{RowBox [\{RowBox [\{minusV, [, RowBox [\{4, ,, 4\}], ]\}\}],
                         =, FractionBox [RowBox [{-, 1}], RowBox [{Dv, -, Cv, +, L}]]]], ;}],
                      , RowBox [\{RowBox [\{minusV, [, RowBox [\{5, ,, 2\}], ]\}]\}]
                         =, RowBox [{FractionBox [1, RowBox [{Cv, -, L}]],
                            RowBox [\{(, RowBox [\{1, -, f\}], )\}], tv\}]\}], ;\}],
                      , RowBox [{RowBox [{RowBox [{minusV}, [ ], RowBox [{5, ,, 5}], [ ]]}],
                         =, FractionBox [RowBox [{-, 1}], T]]], ;}],
                      , RowBox [\{RowBox [\{RowBox [\{minusV, [, RowBox [\{6, ,, 5\}], ]\}\}],
                         =, FractionBox [1, T]}], ;}],
                      , RowBox [{RowBox [{minusV , [ ], RowBox [{6, ,, 6}], [ ]}], =,
                         FractionBox [RowBox [{-, 1}], RowBox [{Dv, -, Cv, +, L, -, T}]]}], ;}],
                      , RowBox [{RowBox [{minusV, \mathbb{I}, RowBox [{7, ,, 2}], \mathbb{I}}], =,
```

```
RowBox [\{(, RowBox [\{1, -, q, -, tv\}], )\}]\}], ;\}],
                                           , RowBox [\{RowBox [\{minusV, [, RowBox [\{7, ,, 7\}], ]\}]\}]
                                                   =, FractionBox [RowBox [{-, 1}], RowBox [{Dv, -, Cv, +, L}]]]], ;}],
                                           , RowBox [\{RowBox [\{V, =, RowBox [\{-, minusV\}]\}\}], ;\}],
                                           , RowBox [{R0formula , = ,
                                          RowBox [{RowBox [{RowBox [{Eigenvalues , [, RowBox [{F, ., RowBox [{Inverse , [, V, ]}]]],
                                                                   ]], [, RowBox [{-, 1}], ]], //, FullSimplify ]]]]], Input,
                         CellChangeTimes \rightarrow {{3.79621 × 10<sup>9</sup>}}, CellLabel \rightarrow In[2288]:=,
                          ExpressionUUID \rightarrow 82 fe846a - f9ff - 40b2 - 93bb - 1802 a630c7ae ],
                     Cell[BoxData [RowBox [{RowBox [
                                          \{(, RowBox [\{RowBox [\{(, RowBox [\{(, RowBox [\{(, RowBox [\{(, RowBox [\{f, -, Row
                                                                                 RowBox [\{f, , h\}], +, RowBox [\{RowBox [\{(, RowBox [\{RowBox [\{-, 1\}], +, f\}], \}]\}]
                                                                                                )}], , RowBox [{(, RowBox [{RowBox [{-, 1}], +, i}], )}], , q}])],
                                                       +, RowBox [{RowBox [{(, RowBox [{RowBox [{-, 1}], +, f}], )}], , RowBox [
                                                                    \{(, RowBox [\{RowBox [\{-, 1\}], +, j\}], )\}], , RowBox [
                                                                   \{(, RowBox [\{Cv, -, L, +, T\}], )\}], , tv\}], +, RowBox [\{Dv, , RowBox [\{Cv, -, L, +, T\}], \}]\}]
                                                                    \{(, RowBox [\{1, +, RowBox [\{RowBox [\{(, RowBox [\{RowBox [\{-, 1\}], +, i\}], )\}], , q\}], \}\})\}\}
                                                                                +, RowBox [\{RowBox [\{(, RowBox [\{-, 1\}], +, j\}], )\}], , tv\}], +,
                                                                                RowBox [\{f, , RowBox [\{(, RowBox [\{RowBox [\{-, 1\}], +, h, +, q, -, RowBox [\{-, 1\}], +, h, -, RowBox [\{-, 1\}], +, RowBox [\{-, 1\}], 
                                                                                                             \{i, , q\}, +, tv, -, RowBox[\{j, , tv\}]\}, \}\}\}\}, \}\}, \beta\}], , \beta\}]]
                         Output, CellChangeTimes \rightarrow \{\{3.79621 \times 10^9, 3.79621 \times 10^9\}, 3.79621 \times 10^9\},
                         CellLabel →
                             Out[2306]=,
                          ExpressionUUID \rightarrow 98650565 -ac96 -4d33 -a468 -2323 e7149ee9 ]},
                Open]], Cell[
             CellGroupData [
                {Cell[
                         BoxData [
                              RowBox [{TeXForm, [, RowBox [{R0formula, /, \beta}], ]}]],
                         Input, CellChangeTimes \rightarrow {{3.79621 × 10<sup>9</sup>}}, 3.79621 × 10<sup>9</sup>}},
                         CellLabel \rightarrow In[2307]:=,
                         ExpressionUUID →
                             859 c1870 -10 b0 -4462 -9957 -944 cc4072d8b ], Cell[
(\text{text} \{Cv\}-L) \ (f \ (-h)+(f-1) \ (i-1) \ q+f)+(f-1) \ (j-1) \ \text{text} \{tv\}
(\text{text}(Cv)-L+T)+\text{text}(Dv) (f
            (h-i q-j \text{text}\{tv\}+q+\text{text}\{tv\}-1)+(i-1) q+(j-1) \text{text}\{tv\}+1)
 , Output,
                         CellChangeTimes \rightarrow {{3.79621 × 10<sup>9</sup>, 3.79621 × 10<sup>9</sup>}}, CellLabel \rightarrow Out[2307]//TeXForm =,
                          ExpressionUUID \rightarrow e129684e -d062 -4414 -8f76 - c45e84642a59 \}, Open \}
    WindowSize \rightarrow {734, 621}, WindowMargins \rightarrow {{Automatic , 139}, {-10, Automatic }},
```

RowBox [{FractionBox [1, RowBox [{Cv, -, L}]], RowBox [{(, RowBox [{1, -, f}], )}],

```
FrontEndVersion →
                    11.3 for Microsoft Windows (64-bit) (March 6, 2018),
                 StyleDefinitions → Default .nb]
Out[4]= Notebook [
                 {Cell[CellGroupData [{Cell[BoxData [{RowBox [{RowBox [{emptymat , = , RowBox [{Table , [ , RowBox [
                                                         \{0, ,, RowBox [\{\{, RowBox [\{ic, ,, 1, ,, 7\}], \}\}], ,,
                                                            RowBox [\{\{, RowBox [\{jc, ,, 1, ,, 7\}], \}\}]\}], [\}]\}], ;\}],
                                            , RowBox [{RowBox [{F, =, emptymat }], ;}],
                                               RowBox [{RowBox [{RowBox [{F, \mathbb{I}, 1, \mathbb{I}}]}, =, RowBox [{{, RowBox [{0, ,, \beta, ,, RowBox [{h, ,
                                                                  \beta], ,, RowBox [{i, , \beta}], ,, \beta, ,, RowBox [{j, , \beta}], ,, \beta}], }}]]], ;}],
                                              RowBox [{RowBox [{minusV, =, emptymat }], ;}],
                                               RowBox [\{RowBox [\{RowBox [\{minusV, [, RowBox [\{1, ,, 1\}], ]\}\}],
                                                 =, FractionBox [RowBox [{-, 1}], L]}], ;}],
                                               RowBox [\{RowBox [\{RowBox [\{minusV, [, RowBox [\{2, ,, 1\}], ]\}\}],
                                                 =, FractionBox [1, L]}], ;}],
                                               \label{lem:rowBox} \ensuremath{\mathsf{RowBox}} \ensuremath{[\mathsf{RowBox}} \ensuremat
                                                 =, FractionBox [RowBox [{-, 1}], RowBox [{Cv, -, L}]]]], ;}],
                                           , RowBox [\{RowBox [\{minusV, [, RowBox [\{3, ,, 2\}], ]\}]\}]
                                                 =, RowBox [{FractionBox [1, RowBox [{Cv, -, L}]], f}]], ;}],
                                              RowBox [\{RowBox [\{RowBox [\{minusV, [, RowBox [\{3, ,, 3\}], ]\}\}],
                                                 =, FractionBox [RowBox [{-, 1}], RowBox [{Dv, -, Cv, +, L}]]}], ;}],
                                            , RowBox [{RowBox [{RowBox [{minusV , [, RowBox [{4, ,, 2}], ]]}], =, RowBox [
                                                   {FractionBox [1, RowBox [{Cv, -, L}]], RowBox [{(, RowBox [{1, -, f}], )}], q}]], ;}],
                                            , RowBox [\{RowBox [\{minusV, [, RowBox [\{4, ,, 4\}], ]\}]\}]
                                                 =, FractionBox [RowBox [{-, 1}], RowBox [{Dv, -, Cv, +, L}]]]], ;}],
                                               RowBox [\{RowBox [\{RowBox [\{minusV, [, RowBox [\{5, ,, 2\}], ]\}\}],
                                                 =, RowBox [{FractionBox [1, RowBox [{Cv, -, L}]],
                                                      RowBox [{(, RowBox [{1, -, f}], )}], tv}]], ;}],
                                              RowBox [\{RowBox [\{RowBox [\{minusV, [, RowBox [\{5, ,, 5\}], ]\}\}],
                                                 =, FractionBox [RowBox [{-, 1}], T]}], ;}],
                                            , RowBox [\{RowBox [\{minusV, [, RowBox [\{6, ,, 5\}], ]\}]\}
                                                 =, FractionBox [1, T]}], ;}],
                                               RowBox [\{RowBox [\{RowBox [\{minusV, [, RowBox [\{6, ,, 6\}], ]\}]\}], =,
                                                 FractionBox [RowBox [{-, 1}], RowBox [{Dv, -, Cv, +, L, -, T}]]}], ;}],
                                              RowBox [\{RowBox [\{RowBox [\{minusV, [, RowBox [\{7, ,, 2\}], []\}], =, \}]\}]
                                                 RowBox [{FractionBox [1, RowBox [(Cv, -, L)]], RowBox [((, RowBox [(1, -, f)], ))],
                                                      RowBox [\{(, RowBox [\{1, -, q, -, tv\}], )\}]\}], ;\}],
                                            , RowBox [\{RowBox [\{minusV, [, RowBox [\{7, ,, 7\}], ]\}]\}]
                                                 =, FractionBox [RowBox [{-, 1}], RowBox [{Dv, -, Cv, +, L}]]]], ;}],
                                               RowBox [\{RowBox [\{V, =, RowBox [\{-, minusV\}]\}], ;\}],
                                               RowBox [{R0formula, =,
                                           RowBox [{RowBox [{RowBox [{F, ., RowBox [{Inverse , [, V, ]}]]]},
```

```
CellChangeTimes \rightarrow {{3.79621 × 10<sup>9</sup>}, 3.79621 × 10<sup>9</sup>}}, CellLabel \rightarrow In[2288]:=,
                                                ExpressionUUID \rightarrow 82 fe846a -f9ff -40b2 -93bb -1802 a630c7ae ],
                                            Cell[BoxData [RowBox [{RowBox [
                                                                 \{(, RowBox [\{RowBox [\{(, RowBox [\{(, RowBox [\{(, RowBox [\{(, RowBox [\{f, -, Row
                                                                                                          RowBox [\{f, ,h\}], +, RowBox [\{RowBox [\{(, RowBox [\{RowBox [\{-, 1\}], +, f\}],
                                                                                                                          )}], , RowBox [{(, RowBox [{RowBox [{-, 1}], +, i}], )}], , q}]}],
                                                                               +, RowBox [{RowBox [{(, RowBox [{RowBox [{-, 1}], +, f}], )}], , RowBox [
                                                                                            {(, RowBox [{RowBox [{-, 1}], +, j}], )}], , RowBox [}
                                                                                            {(, RowBox [{1, +, RowBox [{RowBox [{(, RowBox [{RowBox [{-, 1}], +, i}], )}], , q}],
                                                                                                         +, RowBox [\{RowBox [\{(, RowBox [\{-, 1\}], +, j\}], )\}], , tv\}], +,
                                                                                                          \label{eq:rowBox} \ensuremath{\mathsf{RowBox}} \ensuremath{[\{f,\ ,\ \mathsf{RowBox}\,[\{\mbox{\ensuremath{$(\{$}}\ensuremath{\mathsf{FowBox}}\,[\mbox{\ensuremath{$($]}}\ensuremath{\mathsf{FowBox}}\,[\mbox{\ensuremath{$($]}}\ensuremath{\mathsf{FowBox}}\,[\mbox{\ensuremath{$($]}}\ensuremath{\mathsf{FowBox}}\,[\mbox{\ensuremath{$($]}}\ensuremath{\mathsf{FowBox}}\,[\mbox{\ensuremath{$($]}}\ensuremath{\mathsf{FowBox}}\,[\mbox{\ensuremath{$($]}}\ensuremath{\mathsf{FowBox}}\,[\mbox{\ensuremath{$($]}}\ensuremath{\mathsf{FowBox}}\,[\mbox{\ensuremath{$($]}}\ensuremath{\mathsf{FowBox}}\,[\mbox{\ensuremath{$($]}}\ensuremath{\mathsf{FowBox}}\,[\mbox{\ensuremath{$($]}}\ensuremath{\mathsf{FowBox}}\,[\mbox{\ensuremath{$($]}}\ensuremath{\mathsf{FowBox}}\,[\mbox{\ensuremath{$($]}}\ensuremath{\mathsf{FowBox}}\,[\mbox{\ensuremath{$($]}}\ensuremath{\mathsf{FowBox}}\,[\mbox{\ensuremath{$($]}}\ensuremath{\mathsf{FowBox}}\,[\mbox{\ensuremath{$($]}}\ensuremath{\mathsf{FowBox}}\,[\mbox{\ensuremath{$($]}}\ensuremath{\ensuremath{$($]}}\ensuremath{\mathsf{FowBox}}\,[\mbox{\ensuremath{$($]}}\ensuremath{\ensuremath{$($]}}\ensuremath{\ensuremath{$($]}}\ensuremath{\ensuremath{$($]}}\ensuremath{\ensuremath{$($]}}\ensuremath{\ensuremath{$($]}}\ensuremath{\ensuremath{$($]}}\ensuremath{\ensuremath{$($]}}\ensuremath{\ensuremath{$($]}}\ensuremath{\ensuremath{$($]}}\ensuremath{\ensuremath{$($]}}\ensuremath{\ensuremath{\ensuremath{$($]}}\ensuremath{\ensuremath{$($]}}\ensuremath{\ensuremath{\ensuremath{$($]}}\ensuremath{\ensuremath{\ensuremath{$($]}}\ensuremath{\ensuremath{\ensuremath{\ensuremath{$($]}}\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\ensuremath{\e
                                                                                                                                       \{i, , q\}, +, tv, -, RowBox[\{j, , tv\}]\}, \}\}\}, \}\}, \}\}, , \beta\}], , \beta\}
                                                Output, CellChangeTimes \rightarrow \{\{3.79621 \times 10^9, 3.79621 \times 10^9\}, 3.79621 \times 10^9\},
                                                CellLabel →
                                                    Out[2306]=,
                                                ExpressionUUID → 98650565 -ac96 -4d33 -a468 -2323 e7149ee9 ]},
                                      Open]], Cell[
                                   CellGroupData [
                                      {Cell[
                                                BoxData[
                                                    RowBox [{TeXForm , [, RowBox [{R0formula , /, \beta}], ]}]],
                                                Input, CellChangeTimes \rightarrow {{3.79621 × 10<sup>9</sup>}}, 3.79621 × 10<sup>9</sup>}},
                                                CellLabel \rightarrow In[2307]:=,
                                                ExpressionUUID →
                                                     859 c1870 -10 b0 -4462 -9957 -944 cc4072d8b ], Cell[
                     (\text{text} \{Cv\}-L) \ (f \ (-h)+(f-1) \ (i-1) \ q+f)+(f-1) \ (j-1) \ \text{text} \{tv\}
                     (\text{text}(Cv)-L+T)+\text{text}(Dv) (f
                                 (h-i q-j \text{text}\{tv\}+q+\text{text}\{tv\}-1)+(i-1) q+(j-1) \text{text}\{tv\}+1)
                       , Output,
                                                CellChangeTimes \rightarrow {{3.79621 × 10<sup>9</sup>, 3.79621 × 10<sup>9</sup>}}, CellLabel \rightarrow Out[2307]//TeXForm =,
                                                ExpressionUUID \rightarrow e129684e -d062 -4414 -8f76 - c45e84642a59 \}, Open \}
                          WindowSize \rightarrow {734, 621}, WindowMargins \rightarrow {{Automatic , 139}, {-10, Automatic }},
                          FrontEndVersion →
                              11.3 for Microsoft Windows (64-bit) (March 6, 2018),
                          StyleDefinitions → Default .nb]
                     NotebookPut [%2]
 In[5]:=
                     NotebookObject Automatic
Out[5]=
```

]]], [, RowBox [{-, 1}], ]]], //, FullSimplify }]]]]], Input,