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In[1]:= (* MA39110 / Assignment 10 / 16MA20053 / NER ROHIT *)
ClearAll["Global`*"];
Model[n0_, nu0_, t0_] := Module[{n = 100 * n0, nu = nu0, t = t0},
  x0 = 0; xf = 10; h = (xf - x0) / n;
  X = Table[x0 + x * h, {x, 1, n - 1}];
  XT = Table[x0 + x * h, {x, 0, n}];
  f[x_] = UnitTriangle[20 x - 1];
  PLT = Table[Table[0, {y, 0, n}], {x, 1, n + 1}];
  U = Table[f[XT[[x]]], {x, 1, n + 1}];
  UT = U;
  For[j = 1, j ≤ t, j++, {
    For[i = 2, i < n, i++, {
      {
        U = UT;
        UT[[i]] = (1 - nu) U[[i]] + nu * U[[i - 1]]
      }
    }];
    PLT[[j]] = U;
  }];
  PLT
];
sol1 = Model[30, 0.1, 200];
sol2 = Model[30, 0.3, 200];
sol3 = Model[30, 0.5, 200];
Rotate[GraphicsGrid[
  {{Show[{ListLinePlot[Transpose[{XT, sol1[[1]]}][[1 ;; 200 ;; 1]], PlotRange → {0, 1},
    PlotStyle → Red]}, {ListLinePlot[Transpose[{XT, sol2[[1]]}][[1 ;; 200 ;; 1]],
    PlotRange → {0, 1}, PlotStyle → Green]}, {ListLinePlot[
    Transpose[{XT, sol3[[1]]}][[1 ;; 200 ;; 1]], PlotRange → {0, 1}, PlotStyle → Blue]}]},
  Show[{ListLinePlot[Transpose[{XT, sol1[[40]]}][[1 ;; 200 ;; 1]],
    PlotRange → {0, 1}, PlotStyle → Red]},
  {ListLinePlot[Transpose[{XT, sol2[[40]]}][[1 ;; 200 ;; 1]], PlotRange → {0, 1},
    PlotStyle → Green]}, {ListLinePlot[Transpose[{XT, sol3[[40]]}][[1 ;; 200 ;; 1]],
    PlotRange → {0, 1}, PlotStyle → Blue]}]},
  Show[{ListLinePlot[Transpose[{XT, sol1[[80]]}][[1 ;; 200 ;; 1]],
    PlotRange → {0, 1}, PlotStyle → Red]},
  {ListLinePlot[Transpose[{XT, sol2[[80]]}][[1 ;; 200 ;; 1]], PlotRange → {0, 1},
    PlotStyle → Green]}, {ListLinePlot[Transpose[{XT, sol3[[80]]}][[1 ;; 200 ;; 1]],
    PlotRange → {0, 1}, PlotStyle → Blue]}]},
  {Show[{ListLinePlot[Transpose[{XT, sol1[[120]]}][[1 ;; 200 ;; 1]],
    PlotRange → {0, 1}, PlotStyle → Red]},
  {ListLinePlot[Transpose[{XT, sol2[[120]]}][[1 ;; 200 ;; 1]], PlotRange → {0, 1},
    PlotStyle → Green]}, {ListLinePlot[Transpose[{XT, sol3[[120]]}][[1 ;; 200 ;; 1]],
    PlotRange → {0, 1}, PlotStyle → Blue]}]},
  Show[{ListLinePlot[Transpose[{XT, sol1[[160]]}][[1 ;; 200 ;; 1]],
    PlotRange → {0, 1}, PlotStyle → Red]},
  {ListLinePlot[Transpose[{XT, sol2[[160]]}][[1 ;; 200 ;; 1]], PlotRange → {0, 1},
    PlotStyle → Green]}, {ListLinePlot[Transpose[{XT, sol3[[160]]}][[1 ;; 200 ;; 1]],
    PlotRange → {0, 1}, PlotStyle → Blue]}]},
  Show[{ListLinePlot[Transpose[{XT, sol1[[200]]}][[1 ;; 200 ;; 1]],
    PlotRange → {0, 1}, PlotStyle → Red]}],

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{ListLinePlot[Transpose[{XT, sol2[[200]]}][[1 ;; 200 ;; 1]], PlotRange -> {0, 1},
PlotStyle -> Green]}, {ListLinePlot[Transpose[{XT, sol3[[200]]}][[1 ;; 200 ;; 1]],
PlotRange -> {0, 1}, PlotStyle -> Blue]}]}], Pi/2]
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Out[6]=

