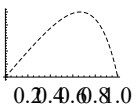
In[762]:=
```
k = 2;
a = 0.5;
a1 = (a^2 - 1)/2;(*0.1,0.5,1,3*)
a2 = (a^2 - 1) a1;
We = 0;
x[1] = 0;
H = .666667;
For[ii = 1, ii ≤ 11, ii++,
  h = k - (k - 1) * x[ii];
  sol = NDSolve[{D[(u''[y] + We^2 a1 (u''[y])^3 + We^4 a2 (u''[y])^5), y, y] == 0, u[0] == 0,
     u'[0] == 1, u[h] == H, u'[h] == 0}, {u[y], u'[y], u''[y], u'''[y]}, {y, 0, h}];
  ppx = Table[(u^(3)[y] + 3 a1 We^2 u''[y]^2 u^(3)[y] + 5 a2 We^4 u''[y]^4 u^(3)[y]) /. sol,
    {y, 0, h, 0.1}];
  px[ii] = (u^(3)[y] + 3 a1 We^2 u''[y]^2 u^(3)[y] + 5 a2 We^4 u''[y]^4 u^(3)[y]) /. sol /. y → 0;
  x[ii + 1] = x[ii] + 0.1;
 ];
tt = Table[{x[ii], px[ii][[1]]}, {ii, 1, 11}];
fff = Interpolation[tt];
ggg = Integrate[Interpolation[tt][x], x];
hhh = Integrate[ggg, {x, 0, 1}];
Table[ggg, {x, 1, 1}]
(*pressure*)
Plot[ggg, {x, 0, 1}, Frame → True,
 PlotStyle → {{Thin, Black}}, LabelStyle → Directive[Black, 12],
 FrameLabel → {"", "", "   ", ""}, FrameStyle → Directive[Thin],
 LabelStyle → Directive[18], Epilog → {Arrow[{{}, {}}], Text[""]}]
(*pressure gradiant*)
Plot[fff[x], {x, 0, 1}, Frame → True, PlotRange → All,
  PlotStyle → {{Thick, Black}}, LabelStyle → Directive[Black, 12],
  FrameLabel → {"", "", " dp/px ", ""}, FrameStyle → Directive[Thin],
  LabelStyle → Directive[18], Epilog → {Arrow[{{}, {}}], Text[""]}];
(*velocity*)
Plot[u'[y] /. sol, {y, 0, h}, Frame → True,
  PlotStyle → {{Thick, Black}}, LabelStyle → Directive[Black, 12],
  FrameLabel → {"", "", " v ", ""}, FrameStyle → Directive[Thin],
  LabelStyle → Directive[18], Epilog → {Arrow[{{}, {}}], Text[""]}];
```

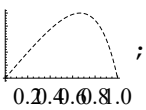
Out[773]= {0.0000240367}

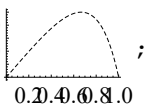
In[777]:=
```
p111 = cer2[ 0. ,  0. ]
       Spacer2[ 0.
```
;

In[810]:=
```
a = 0.5;
η = 1;
```

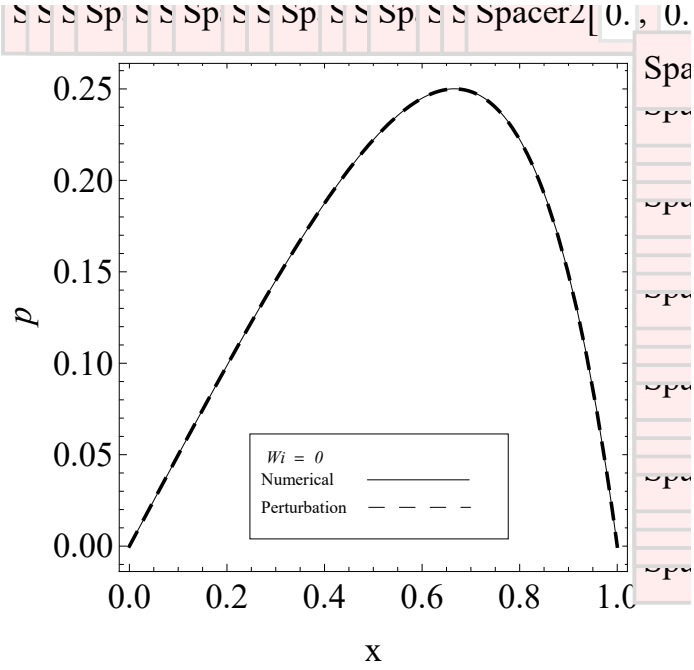
```
μ = 1;
k = 2;(*0,0.2,0.3*)
b = 0;
α1 = (a^2 - 1) η / (η + μ);(*0.1,0.5,1,3*)
α2 = (a^2 - 1) α1;
pp = -6 (-1 + k) (-1 + x) x / ((1 + k) (k + x - k x)^2) -
     1/(25 k (1 + k)^3 (k + x - k x)^6) 12 b^2 (-1 + k) (-1 + x) x (k^3 (79 + k (-32 + k (77 + 26 k))) -
       (-1 + k) k^2 (63 + k (55 + k (191 + 91 k))) x + 3 (-1 + k)^2 k (29 + k (49 + k (53 + 39 k)))
        x^2 - (-1 + k)^3 (1 + 5 k) (13 + k (8 + 13 k)) x^3 + (-1 + k)^4 (13 + k (8 + 13 k)) x^4) α1 +
     1/(30 625 k^3 (1 + k)^5 (k + x - k x)^10) 8 b^4 (-1 + k) (-1 + x) x
      (9 (-1 + k)^2 (26 164 k^12 (-2 + x) (-1 + x)^7 + 26 164 x^7 (1 + x) + k x^6
            (209 312 + (26 439 - 235 201 x) x) - k^11 (-1 + x)^6 (-550 + x (-443 963 + 235 201 x)) +
          2 k^10 (-1 + x)^5 (-10 945 + x (75 985 + x (-906 523 + 487 927 x))) +
          2 k^2 x^5 (353 556 + x (-273 280 + x (-557 258 + 487 927 x))) + 4 k^6 (-1 + x) x
           (-168 418 + (-1 + x) x (-476 296 + (-1 + x) x (346 861 + 1 655 413 (-1 + x) x))) -
          5 k^3 x^4 (-282 331 + x (438 137 + x (341 729 + x (-1 035 337 + 498 297 x)))) -
          5 k^9 (-1 + x)^4 (-39 505 + x (-8772 + x (225 500 + x (-957 851 + 498 297 x)))) + 20 k^4
           x^3 (85 379 + x (-199 689 + x (-23 569 + x (560 189 + 11 x (-58 191 + 20 203 x))))) +
          20 k^8 (-1 + x)^3 (-4442 + x (-15 499 + x (-38 722 + x (222 115 +
                      11 x (-42 824 + 20 203 x))))) + k^5 x^2 (1 427 274 + x (-4 230 511 + 2 x
                  (872 810 + x (6 586 595 + x (-13 525 745 + (10 584 551 - 3 015 409 x) x))))) -
          k^7 (-1 + x)^2 (-202 367 + x (234 941 + 2 x (-92 500 + x (-1 979 055 +
                      x (5 834 125 + x (-7 507 903 + 3 015 409 x)))))) α1^2 - 250 (2 k^7 (3616 +
             k (-4429 + k (4302 + k (-3193 + k (2038 + k (1683 + k (-1031 + 689 k)))))))) -
          (-1 + k) k^6 (17 267 + k (-21 021 + k (15 543 + k (-6983 +
                      k (14 973 + k (25 929 + k (-16 843 + 10 335 k))))))) x +
          (-1 + k)^2 k^5 (40 814 + k (-38 829 + k (11 524 + k (44 317 + k (9938 +
                         k (88 291 + k (-59 476 + 33 761 k))))))) x^2 -
          (-1 + k)^3 k^4 (46 410 + k (-31 846 + k (-1865 + k (138 739 + k (-36 884 +
                         k (173 044 + 13 k (-9125 + 4823 k))))))) x^3 +
          (-1 + k)^4 k^3 (40 306 + k (-994 + k (-37 264 + k (190 331 + k (-92 344 +
                         5 k (42 550 + k (-29 230 + 14 469 k))))))) x^4 -
          (-1 + k)^5 k^2 (19 292 + k (11 438 + k (-58 254 + k (155 082 + k (-97 575 +
                         k (167 361 + k (-113 837 + 53 053 k))))))) x^5 +
          (-1 + k)^6 k (5512 + k (11 044 + k (-38 486 + k (78 060 + k (-56 266 +
                         k (81 919 + k (-54 688 + 24 115 k))))))) x^6 - (-1 + k)^7 (1 + 9 k)
           (689 + k (-1720 + k (2714 + k (-2228 + k (2714 + k (-1720 + 689 k)))))) x^7 +
          (-1 + k)^8 (689 + k (-1720 + k (2714 + k (-2228 + k (2714 + k (-1720 + 689 k)))))))
           x^8) α2);
Plot[pp, {x, 0, 1}, PlotStyle → {Thickness[0.007], Dashing[.030], Black},
 LabelStyle → Directive[Black, 12]]
```

In[817]:= **p1111 =**  **;**

In[794]:= **p =**  **;**

In[778]:= **p22 =**  **;**

In[819]:=
```
Show[{p111, p1111}, Frame → True, PlotRange → All, LabelStyle → Directive[Black, 18],
 AspectRatio → 1, FrameLabel → {"x", "p", " a = 0.5, k = 2", ""},
 FrameStyle → Directive[Thin], LabelStyle → Directive[Black, 18], Axes → False]
```

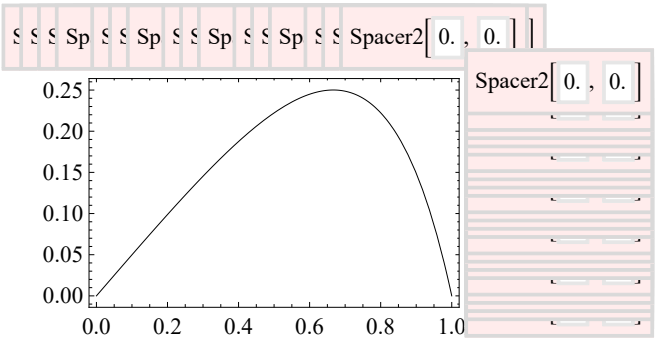


In[35]:=
```
k = 2;
a = 0.5;
a1 = (a^2 - 1)/2;(*0.1,0.5,1,3*)
a2 = (a^2 - 1) a1;
We = 0;
x[1] = 0;
H = .66667;
For[ii = 1, ii ≤ 11, ii++,
  h = k - (k - 1) * x[ii];
  sol = NDSolve[{D[(u''[y] + We^2 a1 (u''[y])^3 + We^4 a2 (u''[y])^5), y, y] == 0, u[0] == 0,
     u'[0] == 1, u[h] == H, u'[h] == 0}, {u[y], u'[y], u''[y], u'''[y]}, {y, 0, h}];
  ppx = Table[(u^(3)[y] + 3 a1 We^2 u''[y]^2 u^(3)[y] + 5 a2 We^4 u''[y]^4 u^(3)[y]) /. sol,
    {y, 0, h, 0.1}];
  px[ii] = (u^(3)[y] + 3 a1 We^2 u''[y]^2 u^(3)[y] + 5 a2 We^4 u''[y]^4 u^(3)[y]) /. sol /. y → 0;
  x[ii + 1] = x[ii] + 0.1;
 ];
tt = Table[{x[ii], px[ii][[1]]}, {ii, 1, 11}];
fff = Interpolation[tt];
ggg = Integrate[Interpolation[tt][x], x];
hhh = Integrate[ggg, {x, 0, 1}];
Integrate[ggg, {x, 0, 1}]
Table[ggg, {x, 1, 1}]
(*pressure*)
Plot[ggg, {x, 0, 1}, Frame → True,
 PlotStyle → {{Thin, Black}}, LabelStyle → Directive[Black, 12],
 FrameLabel → {"", "", "  ", ""}, FrameStyle → Directive[Thin],
 LabelStyle → Directive[18], Epilog → {Arrow[{{}, {}}], Text[""]}]
(*pressure gradiant*)
Plot[fff[x], {x, 0, 1}, Frame → True, PlotRange → All,
  PlotStyle → {{Thick, Black}}, LabelStyle → Directive[Black, 12],
  FrameLabel → {"", "", " dp/px ", ""}, FrameStyle → Directive[Thin],
  LabelStyle → Directive[18], Epilog → {Arrow[{{}, {}}], Text[""]}];
(*velocity*)
Plot[u'[y] /. sol, {y, 0, h}, Frame → True,
  PlotStyle → {{Thick, Black}}, LabelStyle → Directive[Black, 12],
  FrameLabel → {"", "", " v ", ""}, FrameStyle → Directive[Thin],
  LabelStyle → Directive[18], Epilog → {Arrow[{{}, {}}], Text[""]}];
```

Out[47]= 0.158941

Out[48]= {0.000010537}

Out[49]=

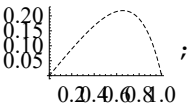



In[10]:=
```
u1 = ;
```

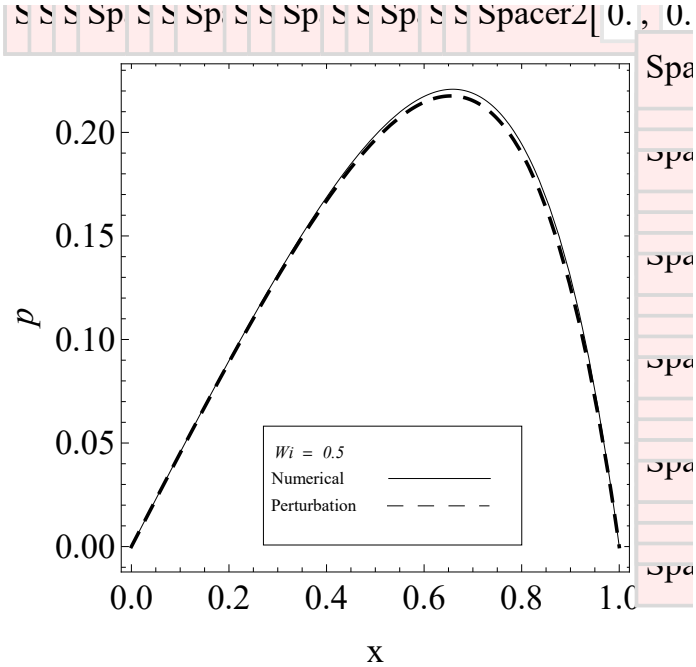
In[1]:=
```
a = 0.5;
η = 1;
μ = 1;
k = 2;(*0,0.2,0.3*)
b = 0.5;
α1 = (a^2 - 1) η / (η + μ);(*0.1,0.5,1,3*)
α2 = (a^2 - 1) α1;
pp = -6 (-1 + k) (-1 + x) x / ((1 + k) (k + x - k x)^2) -
  1 / (25 k (1 + k)^3 (k + x - k x)^6) 12 b^2 (-1 + k) (-1 + x) x (k^3 (79 + k (-32 + k (77 + 26 k))) -
    (-1 + k) k^2 (63 + k (55 + k (191 + 91 k))) x + 3 (-1 + k)^2 k (29 + k (49 + k (53 + 39 k))) x^2 -
    (-1 + k)^3 (1 + 5 k) (13 + k (8 + 13 k)) x^3 + (-1 + k)^4 (13 + k (8 + 13 k)) x^4) α1 +
  1 / (30 625 k^3 (1 + k)^5 (k + x - k x)^10) 8 b^4 (-1 + k) (-1 + x) x
   (9 (-1 + k)^2 (26 164 k^12 (-2 + x) (-1 + x)^7 + 26 164 x^7 (1 + x) + k x^6
       (209 312 + (26 439 - 235 201 x) x) - k^11 (-1 + x)^6 (-550 + x (-443 963 + 235 201 x)) +
     2 k^10 (-1 + x)^5 (-10 945 + x (75 985 + x (-906 523 + 487 927 x))) +
     2 k^2 x^5 (353 556 + x (-273 280 + x (-557 258 + 487 927 x))) + 4 k^6 (-1 + x) x
      (-168 418 + (-1 + x) x (-476 296 + (-1 + x) x (346 861 + 1 655 413 (-1 + x) x))) -
     5 k^3 x^4 (-282 331 + x (438 137 + x (341 729 + x (-1 035 337 + 498 297 x)))) -
     5 k^9 (-1 + x)^4 (-39 505 + x (-8772 + x (225 500 + x (-957 851 + 498 297 x)))) + 20 k^4
      x^3 (85 379 + x (-199 689 + x (-23 569 + x (560 189 + 11 x (-58 191 + 20 203 x))))) +
     20 k^8 (-1 + x)^3 (-4442 + x (-15 499 + x (-38 722 + x (222 115 +
                11 x (-42 824 + 20 203 x))))) + k^5 x^2 (1 427 274 + x (-4 230 511 + 2 x
           (872 810 + x (6 586 595 + x (-13 525 745 + (10 584 551 - 3 015 409 x) x))))) -
```

```
k^7 (-1+x)^2 (-202 367+x (234 941+2 x (-92 500+x (-1 979 055+
                x (5 834 125+x (-7 507 903+3 015 409 x)))))) α1^2-250 (2 k^7 (3616+
   k (-4429+k (4302+k (-3193+k (2038+k (1683+k (-1031+689 k))))))) -
(-1+k) k^6 (17 267+k (-21 021+k (15 543+k (-6983+
                k (14 973+k (25 929+k (-16 843+10 335 k))))))) x+
(-1+k)^2 k^5 (40 814+k (-38 829+k (11 524+k (44 317+k (9938+
                  k (88 291+k (-59 476+33 761 k))))))) x^2-
(-1+k)^3 k^4 (46 410+k (-31 846+k (-1865+k (138 739+k (-36 884+
                  k (173 044+13 k (-9125+4823 k))))))) x^3+
(-1+k)^4 k^3 (40 306+k (-994+k (-37 264+k (190 331+k (-92 344+
                  5 k (42 550+k (-29 230+14 469 k))))))) x^4-
(-1+k)^5 k^2 (19 292+k (11 438+k (-58 254+k (155 082+k (-97 575+
                  k (167 361+k (-113 837+53 053 k))))))) x^5+
(-1+k)^6 k (5512+k (11 044+k (-38 486+k (78 060+k (-56 266+
                  k (81 919+k (-54 688+24 115 k))))))) x^6-(-1+k)^7 (1+9 k)
 (689+k (-1720+k (2714+k (-2228+k (2714+k (-1720+689 k)))))) x^7+
(-1+k)^8 (689+k (-1720+k (2714+k (-2228+k (2714+k (-1720+689 k)))))) x^8) α2);
Plot[pp, {x, 0, 1}, PlotStyle → {Thickness[0.007], Dashing[.030], Black},
 LabelStyle → Directive[Black, 12]]
```

In[9]:=
```
u2 = ;
```




In[11]:=
```
Show[{u1, u2}, Frame → True, PlotRange → All, LabelStyle → Directive[Black, 18],
 AspectRatio → 1, FrameLabel → {"x", "p", " a = 0.5, k = 2", ""},
 FrameStyle → Directive[Thin], LabelStyle → Directive[Black, 18], Axes → False]
```



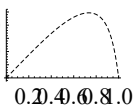
In[161]:=
```
k = 2;
a = 0.5;
a1 = (a^2 - 1)/2;(*0.1,0.5,1,3*)
a2 = (a^2 - 1) a1;
We = 1;
x[1] = 0;
H = .643699;
For[ii = 1, ii ≤ 11, ii++,
  h = k - (k - 1) * x[ii];
  sol = NDSolve[{D[(u''[y] + We^2 a1 (u''[y])^3 + We^4 a2 (u''[y])^5), y, y] == 0, u[0] == 0,
     u'[0] == 1, u[h] == H, u'[h] == 0}, {u[y], u'[y], u''[y], u'''[y]}, {y, 0, h}];
  ppx = Table[(u^(3)[y] + 3 a1 We^2 u''[y]^2 u^(3)[y] + 5 a2 We^4 u''[y]^4 u^(3)[y]) /. sol,
    {y, 0, h, 0.1}];
  px[ii] = (u^(3)[y] + 3 a1 We^2 u''[y]^2 u^(3)[y] + 5 a2 We^4 u''[y]^4 u^(3)[y]) /. sol /. y → 0;
  x[ii + 1] = x[ii] + 0.1;
 ];
tt = Table[{x[ii], px[ii][[1]]}, {ii, 1, 11}];
fff = Interpolation[tt];
ggg = Integrate[Interpolation[tt][x], x];
hhh = Integrate[ggg, {x, 0, 1}];
Table[ggg, {x, 1, 1}]
(*pressure*)
Plot[ggg, {x, 0, 1}, Frame → True,
 PlotStyle → {{Thin, Black}}, LabelStyle → Directive[Black, 12],
 FrameLabel → {"", "", "   ", ""}, FrameStyle → Directive[Thin],
 LabelStyle → Directive[18], Epilog → {Arrow[{{}, {}}], Text[""]}]
(*pressure gradiant*)
Plot[fff[x], {x, 0, 1}, Frame → True, PlotRange → All,
  PlotStyle → {{Thick, Black}}, LabelStyle → Directive[Black, 12],
  FrameLabel → {"", "", " dp/px ", ""}, FrameStyle → Directive[Thin],
  LabelStyle → Directive[18], Epilog → {Arrow[{{}, {}}], Text[""]}];
(*velocity*)
Plot[u'[y] /. sol, {y, 0, h}, Frame → True,
  PlotStyle → {{Thick, Black}}, LabelStyle → Directive[Black, 12],
  FrameLabel → {"", "", " v ", ""}, FrameStyle → Directive[Thin],
  LabelStyle → Directive[18], Epilog → {Arrow[{{}, {}}], Text[""]}];
```

Out[173]= {0.0000486588}

In[9]:=
```
u22 = Spacer2[ 0. , 0. ]
      0.06  Spacer2[ 0.
      0.1
;
```

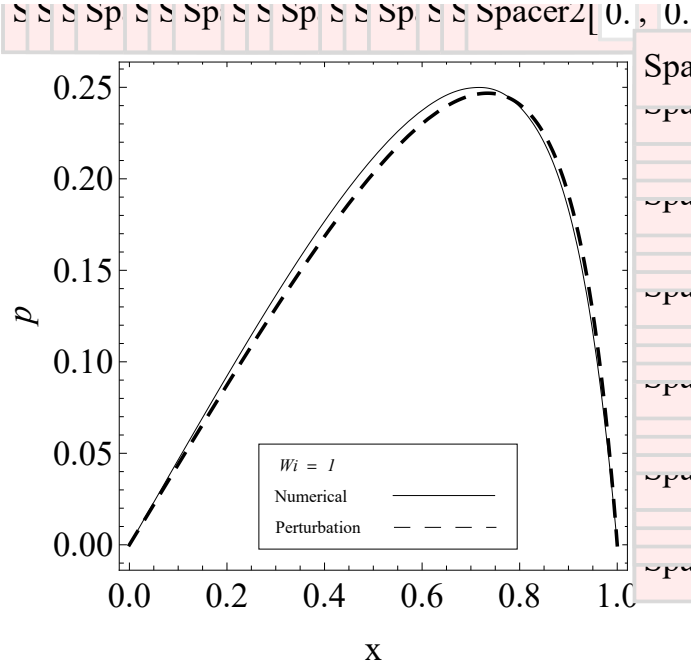
In[1]:=
```
a = 0.5;
η = 1;
```

```
μ = 1;
k = 2;(*0,0.2,0.3*)
b = 1;
α1 = (a^2 - 1) η / (η + μ);(*0.1,0.5,1,3*)
α2 = (a^2 - 1) α1;
pp = -6 (-1 + k) (-1 + x) x / ((1 + k) (k + x - k x)^2) -
     1/(25 k (1 + k)^3 (k + x - k x)^6) 12 b^2 (-1 + k) (-1 + x) x (k^3 (79 + k (-32 + k (77 + 26 k))) -
          (-1 + k) k^2 (63 + k (55 + k (191 + 91 k))) x + 3 (-1 + k)^2 k (29 + k (49 + k (53 + 39 k)))
           x^2 - (-1 + k)^3 (1 + 5 k) (13 + k (8 + 13 k)) x^3 + (-1 + k)^4 (13 + k (8 + 13 k)) x^4) α1 +
     1/(30 625 k^3 (1 + k)^5 (k + x - k x)^10) 8 b^4 (-1 + k) (-1 + x) x
      (9 (-1 + k)^2 (26 164 k^12 (-2 + x) (-1 + x)^7 + 26 164 x^7 (1 + x) + k x^6
              (209 312 + (26 439 - 235 201 x) x) - k^11 (-1 + x)^6 (-550 + x (-443 963 + 235 201 x)) +
            2 k^10 (-1 + x)^5 (-10 945 + x (75 985 + x (-906 523 + 487 927 x))) +
            2 k^2 x^5 (353 556 + x (-273 280 + x (-557 258 + 487 927 x))) + 4 k^6 (-1 + x) x
             (-168 418 + (-1 + x) x (-476 296 + (-1 + x) x (346 861 + 1 655 413 (-1 + x) x))) -
            5 k^3 x^4 (-282 331 + x (438 137 + x (341 729 + x (-1 035 337 + 498 297 x)))) -
            5 k^9 (-1 + x)^4 (-39 505 + x (-8772 + x (225 500 + x (-957 851 + 498 297 x)))) + 20 k^4
             x^3 (85 379 + x (-199 689 + x (-23 569 + x (560 189 + 11 x (-58 191 + 20 203 x))))) +
            20 k^8 (-1 + x)^3 (-4442 + x (-15 499 + x (-38 722 + x (222 115 +
                        11 x (-42 824 + 20 203 x))))) + k^5 x^2 (1 427 274 + x (-4 230 511 + 2 x
                  (872 810 + x (6 586 595 + x (-13 525 745 + (10 584 551 - 3 015 409 x) x))))) -
            k^7 (-1 + x)^2 (-202 367 + x (234 941 + 2 x (-92 500 + x (-1 979 055 +
                        x (5 834 125 + x (-7 507 903 + 3 015 409 x)))))) α1^2 - 250 (2 k^7 (3616 +
               k (-4429 + k (4302 + k (-3193 + k (2038 + k (1683 + k (-1031 + 689 k)))))))) -
            (-1 + k) k^6 (17 267 + k (-21 021 + k (15 543 + k (-6983 +
                        k (14 973 + k (25 929 + k (-16 843 + 10 335 k))))))) x +
            (-1 + k)^2 k^5 (40 814 + k (-38 829 + k (11 524 + k (44 317 + k (9938 +
                           k (88 291 + k (-59 476 + 33 761 k))))))) x^2 -
            (-1 + k)^3 k^4 (46 410 + k (-31 846 + k (-1865 + k (138 739 + k (-36 884 +
                           k (173 044 + 13 k (-9125 + 4823 k))))))) x^3 +
            (-1 + k)^4 k^3 (40 306 + k (-994 + k (-37 264 + k (190 331 + k (-92 344 +
                           5 k (42 550 + k (-29 230 + 14 469 k))))))) x^4 -
            (-1 + k)^5 k^2 (19 292 + k (11 438 + k (-58 254 + k (155 082 + k (-97 575 +
                           k (167 361 + k (-113 837 + 53 053 k))))))) x^5 +
            (-1 + k)^6 k (5512 + k (11 044 + k (-38 486 + k (78 060 + k (-56 266 +
                           k (81 919 + k (-54 688 + 24 115 k))))))) x^6 - (-1 + k)^7 (1 + 9 k)
             (689 + k (-1720 + k (2714 + k (-2228 + k (2714 + k (-1720 + 689 k)))))) x^7 +
            (-1 + k)^8 (689 + k (-1720 + k (2714 + k (-2228 + k (2714 + k (-1720 + 689 k)))))))
             x^8) α2);
Plot[pp, {x, 0, 1}, PlotStyle → {Thickness[0.007], Dashing[.030], Black},
 LabelStyle → Directive[Black, 12]]
```

In[10]:=
```
u33 =
```


```
;
```

In[11]:=
```
Show[{u22, u33}, Frame → True, PlotRange → All, LabelStyle → Directive[Black, 18],
 AspectRatio → 1, FrameLabel → {"x", "p", " a = 0.5, k = 2", ""},
 FrameStyle → Directive[Thin], LabelStyle → Directive[Black, 18], Axes → False]
```

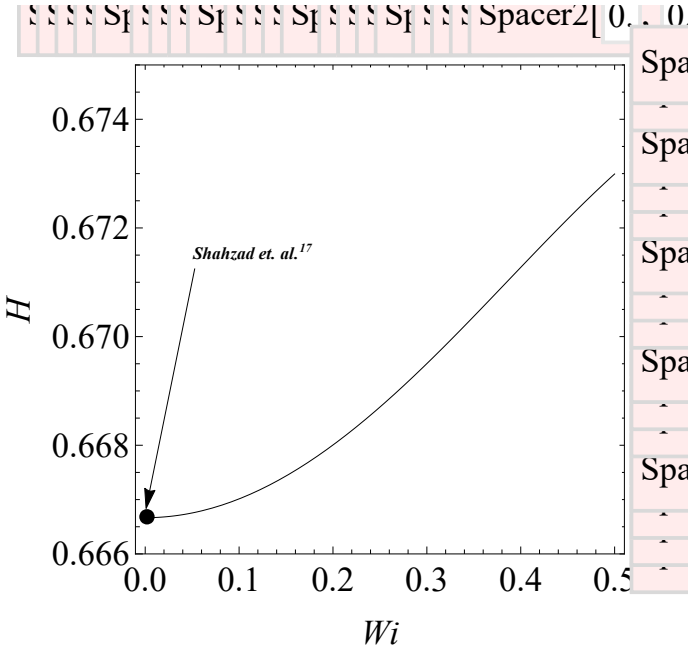


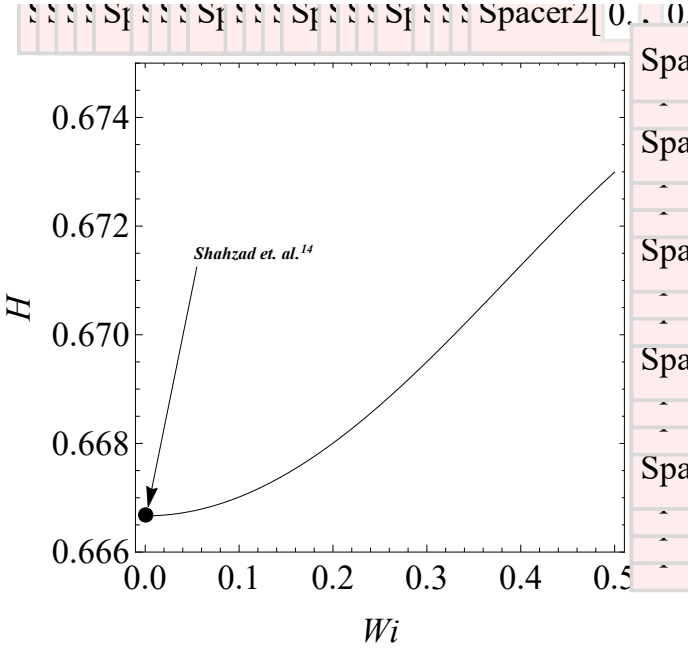
In[108]:=
```
k = 2;
a = 0.5;
η = 1;
μ = 1;
α1 = (a^2 - 1) η / (η + μ); (*0.1,0.5,1,3*)
α2 = (a^2 - 1) α1;
HHH = k/(1 + k) +
  (b^2 (12 α1/(25 (1 + k)^3) + 156 α1/(25 k^3 (1 + k)^3) - 168 α1/(25 k^2 (1 + k)^3) + 12 α1/(25 k (1 + k)^3) - 168 k α1/(25 (1 + k)^3) + 156 k^2 α1/(25 (1 + k)^3)))/
  (-36/(1 + k)^3 - 6/(k^2 (1 + k)^3) - 24/(k (1 + k)^3) - 24 k/(1 + k)^3 - 6 k^2/(1 + k)^3) +
  (b^4 (-2 640 312 α1^2/(30 625 (1 + k)^5) - 1 883 808 α1^2/(30 625 k^5 (1 + k)^5) + 3 747 816 α1^2/(30 625 k^4 (1 + k)^5) - 126 216 α1^2/(875 k^3 (1 + k)^5) +
      5 193 864 α1^2/(30 625 k^2 (1 + k)^5) - 2 640 312 α1^2/(30 625 k (1 + k)^5) + 5 193 864 k α1^2/(30 625 (1 + k)^5) - 126 216 k^2 α1^2/(875 (1 + k)^5) +
      3 747 816 k^3 α1^2/(30 625 (1 + k)^5) - 1 883 808 k^4 α1^2/(30 625 (1 + k)^5) + 9344 α2/(245 (1 + k)^5) + 11 024 α2/(245 k^5 (1 + k)^5) -
      16 496 α2/(245 k^4 (1 + k)^5) + 2272 α2/(35 k^3 (1 + k)^5) - 19 776 α2/(245 k^2 (1 + k)^5) + 9344 α2/(245 k (1 + k)^5) -
      19 776 k α2/(245 (1 + k)^5) + 2272 k^2 α2/(35 (1 + k)^5) - 16 496 k^3 α2/(245 (1 + k)^5) + 11 024 k^4 α2/(245 (1 + k)^5)))/
  (-90/(1 + k)^5 - 6/(k^2 (1 + k)^5) - 36/(k (1 + k)^5) - 120 k/(1 + k)^5 - 90 k^2/(1 + k)^5 - 36 k^3/(1 + k)^5 - 6 k^4/(1 + k)^5)
Plot[HHH, {b, 0, 0.5}, Frame → True, PlotRange → {0.666, .675},
 PlotStyle → {{Thin, Black}}, LabelStyle → Directive[Black, 12],
 FrameLabel → {"", "", "   ", ""}, FrameStyle → Directive[Thin],
 LabelStyle → Directive[18], Epilog → {Arrow[{{}, {}}], Text[""]}]
```

Out[113]=
$$\frac{2}{3} + 0.035\, b^2 - 0.038774\, b^4$$

In[1]:=
```
n1 = cer2[ 0. , 0. ]
0.675 Spacer2[ 0.
0.5
;
```

In[2]:=
```
Show[{n1}, Frame → True, PlotRange → {.666, .675}, LabelStyle → Directive[Black, 18],
 AspectRatio → 1, FrameLabel → {"Wi", "H", " a = 0.5, k = 2", ""},
 FrameStyle → Directive[Thin], LabelStyle → Directive[Black, 18], Axes → False]
```




In[15]:=
```
a = 1;
η = 1;
μ = 1;
k = 6;(*2,4,6*)
x = 0.5;
α1 = (a^2 - 1) η / (η + μ);(*0.1,0.5,1,3*)
α2 = (a^2 - 1) α1;
```

```
pp = -(6 (-1 + k) (-1 + x) x)/((1 + k) (k + x - k x)^2) -
  1/(25 k (1 + k)^3 (k + x - k x)^6) 12 b^2 (-1 + k) (-1 + x) x (k^3 (79 + k (-32 + k (77 + 26 k))) -
      (-1 + k) k^2 (63 + k (55 + k (191 + 91 k))) x + 3 (-1 + k)^2 k (29 + k (49 + k (53 + 39 k)))
       x^2 - (-1 + k)^3 (1 + 5 k) (13 + k (8 + 13 k)) x^3 + (-1 + k)^4 (13 + k (8 + 13 k)) x^4) α1 +
  1/(30 625 k^3 (1 + k)^5 (k + x - k x)^10) 8 b^4 (-1 + k) (-1 + x) x
   (9 (-1 + k)^2 (26 164 k^12 (-2 + x) (-1 + x)^7 + 26 164 x^7 (1 + x) + k x^6
         (209 312 + (26 439 - 235 201 x) x) - k^11 (-1 + x)^6 (-550 + x (-443 963 + 235 201 x)) +
        2 k^10 (-1 + x)^5 (-10 945 + x (75 985 + x (-906 523 + 487 927 x))) +
        2 k^2 x^5 (353 556 + x (-273 280 + x (-557 258 + 487 927 x))) + 4 k^6 (-1 + x) x
         (-168 418 + (-1 + x) x (-476 296 + (-1 + x) x (346 861 + 1 655 413 (-1 + x) x))) -
        5 k^3 x^4 (-282 331 + x (438 137 + x (341 729 + x (-1 035 337 + 498 297 x)))) -
        5 k^9 (-1 + x)^4 (-39 505 + x (-8772 + x (225 500 + x (-957 851 + 498 297 x)))) + 20 k^4
         x^3 (85 379 + x (-199 689 + x (-23 569 + x (560 189 + 11 x (-58 191 + 20 203 x))))) +
        20 k^8 (-1 + x)^3 (-4442 + x (-15 499 + x (-38 722 + x (222 115 +
                  11 x (-42 824 + 20 203 x))))) + k^5 x^2 (1 427 274 + x (-4 230 511 + 2 x
              (872 810 + x (6 586 595 + x (-13 525 745 + (10 584 551 - 3 015 409 x) x))))) -
        k^7 (-1 + x)^2 (-202 367 + x (234 941 + 2 x (-92 500 + x (-1 979 055 +
                  x (5 834 125 + x (-7 507 903 + 3 015 409 x)))))) α1^2 - 250 (2 k^7 (3616 +
           k (-4429 + k (4302 + k (-3193 + k (2038 + k (1683 + k (-1031 + 689 k)))))))) -
        (-1 + k) k^6 (17 267 + k (-21 021 + k (15 543 + k (-6983 +
                  k (14 973 + k (25 929 + k (-16 843 + 10 335 k))))))) x +
        (-1 + k)^2 k^5 (40 814 + k (-38 829 + k (11 524 + k (44 317 + k (9938 +
                  k (88 291 + k (-59 476 + 33 761 k))))))) x^2 -
        (-1 + k)^3 k^4 (46 410 + k (-31 846 + k (-1865 + k (138 739 + k (-36 884 +
                  k (173 044 + 13 k (-9125 + 4823 k))))))) x^3 +
        (-1 + k)^4 k^3 (40 306 + k (-994 + k (-37 264 + k (190 331 + k (-92 344 +
                  5 k (42 550 + k (-29 230 + 14 469 k))))))) x^4 -
        (-1 + k)^5 k^2 (19 292 + k (11 438 + k (-58 254 + k (155 082 + k (-97 575 +
                  k (167 361 + k (-113 837 + 53 053 k))))))) x^5 +
        (-1 + k)^6 k (5512 + k (11 044 + k (-38 486 + k (78 060 + k (-56 266 +
                  k (81 919 + k (-54 688 + 24 115 k))))))) x^6 - (-1 + k)^7 (1 + 9 k)
         (689 + k (-1720 + k (2714 + k (-2228 + k (2714 + k (-1720 + 689 k)))))) x^7 +
        (-1 + k)^8 (689 + k (-1720 + k (2714 + k (-2228 + k (2714 + k (-1720 + 689 k))))))
         x^8) α2);
Plot[pp, {b, 0, .2}, Frame → True, PlotStyle → {{Thick, Black}},
 LabelStyle → Directive[Black, 12], FrameLabel → {"", "", "   ", ""},
 FrameStyle → Directive[Thin], LabelStyle → Directive[18],
 Epilog → {Arrow[{{}, {}}], Text[""]}]
```

In[22]:=
```
o3 = cer2[ 0. , 0. ]
     Spacer2[ 0.
```
;

In[23]:=
```
o2 = cer2[ 0. , 0. ]
     Spacer2[ 0.
```
;

In[24]:=
```
o1 = cer2[ 0. , 0. ]
     Spacer2[ 0.
```
;

In[35]:=
```
Show[{o1, o2, o3}, Frame → True, PlotRange → {0, .3},
 LabelStyle → Directive[Black, 18], AspectRatio → 1,
 FrameLabel → {"x", "p", " a = 0.5, k = 2", ""},
 FrameStyle → Directive[Thin], LabelStyle → Directive[Black, 18], Axes → False]
```

Out[35]=