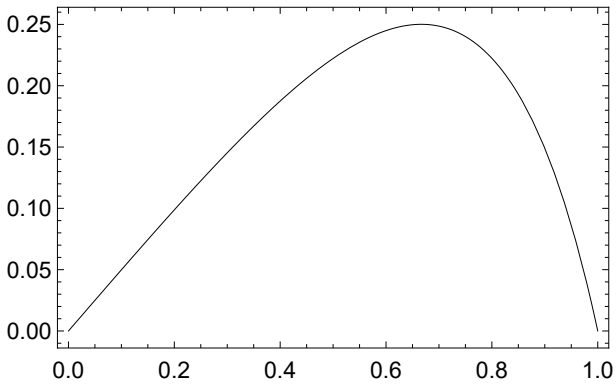
In[1]:=
```
k = 2;
a = 0.5;
a1 = (a^2 - 1)/2;(*0.1,0.5,1,3*)
a2 = (a^2 - 1) a1;
We = 0;
x[1] = 0;
H = .666667;
For[ii = 1, ii ≤ 11, ii++,
  h = k - (k - 1) * x[ii];
  sol = NDSolve[{D[(u''[y] + We^2 a1 (u''[y])^3 + We^4 a2 (u''[y])^5), y, y] == 0, u[0] == 0,
     u'[0] == 1, u[h] == H, u'[h] == 0}, {u[y], 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 → {"", "", " ν ", ""}, FrameStyle → Directive[Thin],
  LabelStyle → Directive[18], Epilog → {Arrow[{{}, {}}], Text[""]}];
```

Out[13]= {0.0000240368}

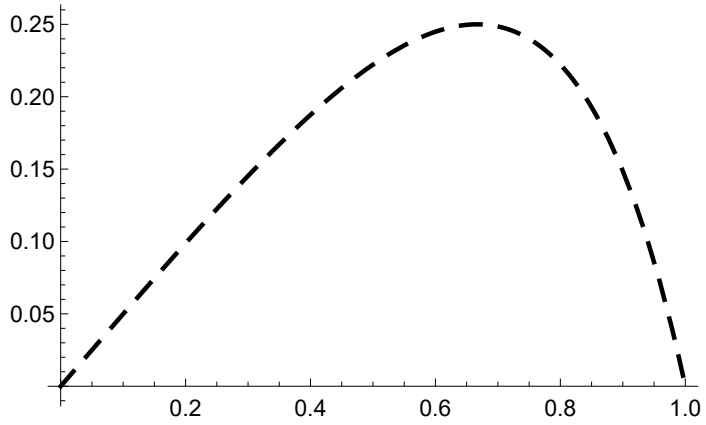
Out[14]=



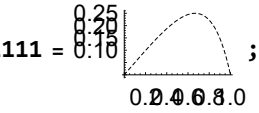
In[17]:= **p111 =** cer2[0. , 0.]
0.26 • Spacer2[0 ;
0.

In[18]:=
```
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/(30625 k^3 (1 + k)^5 (k + x - k x)^10) 8 b^4 (-1 + k) (-1 + x) x
   (9 (-1 + k)^2 (26164 k^12 (-2 + x) (-1 + x)^7 + 26164 x^7 (1 + x) +
       k x^6 (209312 + (26439 - 235201 x) x) - k^11 (-1 + x)^6 (-550 + x (-443963 + 235201 x)) +
       2 k^10 (-1 + x)^5 (-10945 + x (75985 + x (-906523 + 487927 x))) +
       2 k^2 x^5 (353556 + x (-273280 + x (-557258 + 487927 x))) + 4 k^6 (-1 + x) x
        (-168418 + (-1 + x) x (-476296 + (-1 + x) x (346861 + 1655413 (-1 + x) x))) -
       5 k^3 x^4 (-282331 + x (438137 + x (341729 + x (-1035337 + 498297 x)))) -
       5 k^9 (-1 + x)^4 (-39505 + x (-8772 + x (225500 + x (-957851 + 498297 x)))) +
       20 k^4 x^3 (85379 + x (-199689 + x (-23569 + x (560189 + 11 x (-58191 + 20203 x))))) + 20
        k^8 (-1 + x)^3 (-4442 + x (-15499 + x (-38722 + x (222115 + 11 x (-42824 + 20203 x))))) +
       k^5 x^2 (1427274 + x (-4230511 + 2 x (872810 + x (6586595 + x (-13525745 +
                (10584551 - 3015409 x) x))))) - k^7 (-1 + x)^2 (-202367 + x (234941 +
             2 x (-92500 + x (-1979055 + x (5834125 + x (-7507903 + 3015409 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 (17267 + k (-21021 + k (15543 + k (-6983 +
             k (14973 + k (25929 + k (-16843 + 10335 k))))))) x + (-1 + k)^2 k^5 (40814 +
          k (-38829 + k (11524 + k (44317 + k (9938 + k (88291 + k (-59476 + 33761 k))))))) x^2 -
       (-1 + k)^3 k^4 (46410 + k (-31846 + k (-1865 + k (138739 +
             k (-36884 + k (173044 + 13 k (-9125 + 4823 k))))))) x^3 +
       (-1 + k)^4 k^3 (40306 + k (-994 + k (-37264 + k (190331 + k (-92344 + 5 k (42550 +
             k (-29230 + 14469 k))))))) x^4 - (-1 + k)^5 k^2 (19292 + k (11438 + k
          (-58254 + k (155082 + k (-97575 + k (167361 + k (-113837 + 53053 k))))))) x^5 +
       (-1 + k)^6 k (5512 + k (11044 + k (-38486 + k (78060 + k (-56266 +
             k (81919 + k (-54688 + 24115 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]]
```

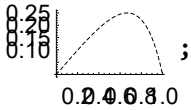
Out[26]=



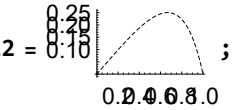
In[27]:= **p1111 = ;**



In[28]:= **p = ;**

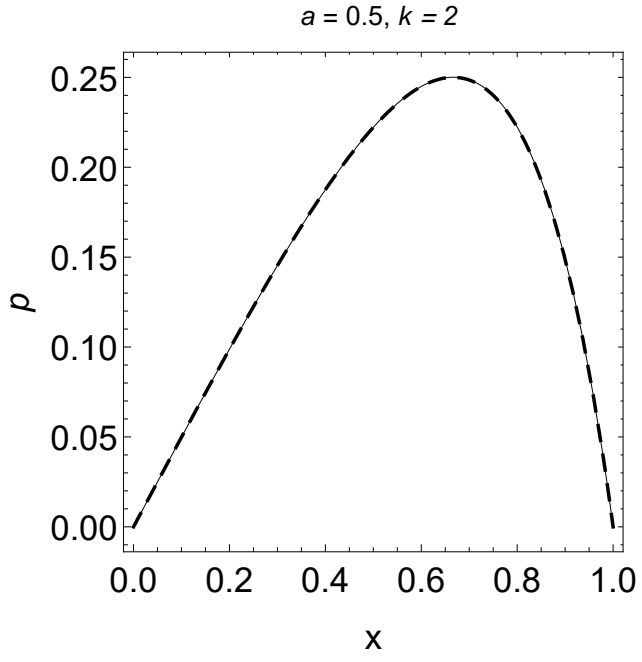


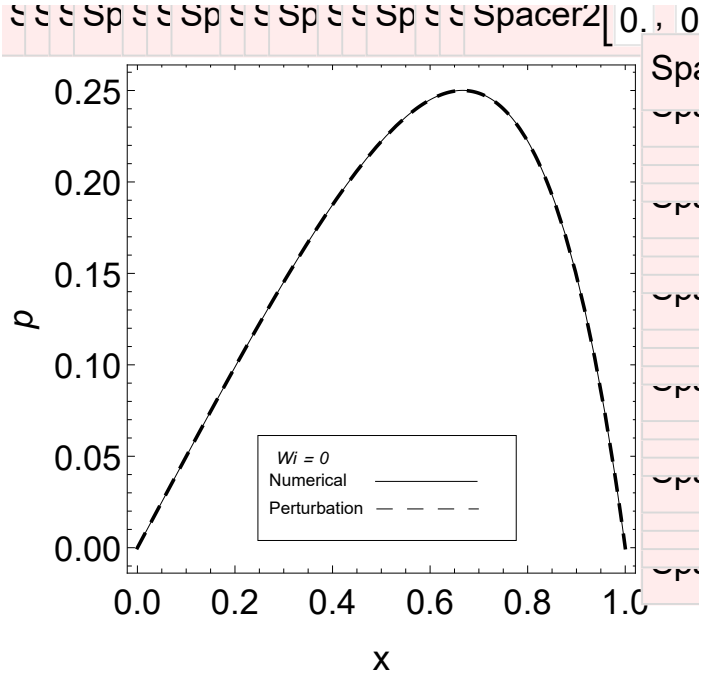
In[29]:= **p22 = ;**



In[30]:= **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]**

Out[30]=



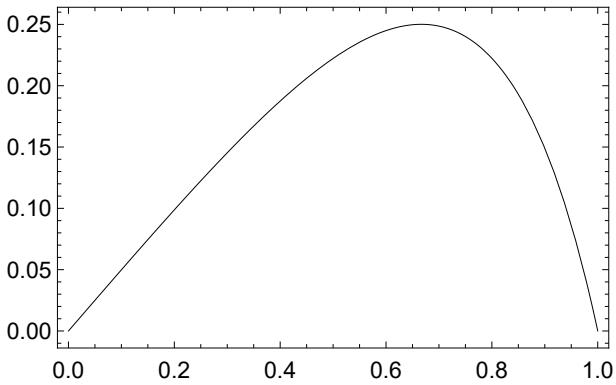

0.25
0.20
0.15
0.10
0.05
0.00
p
0.0
0.2
0.4
0.6
0.8
1.0
x
Wi = 0
Numerical
Perturbation

In[31]:=
```
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[43]= 0.158941

Out[44]= {0.000010537}

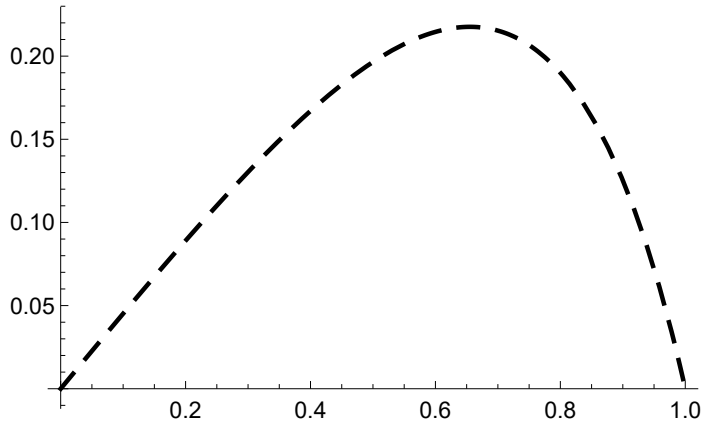
Out[45]=

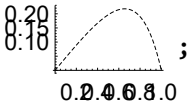


In[48]:= **u1 =** cer2[0. , 0.] Spacer2[0];

In[49]:=
```
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/(30625 k^3 (1 + k)^5 (k + x - k x)^10) 8 b^4 (-1 + k) (-1 + x) x
   (9 (-1 + k)^2 (26164 k^12 (-2 + x) (-1 + x)^7 + 26164 x^7 (1 + x) +
       k x^6 (209312 + (26439 - 235201 x) x) - k^11 (-1 + x)^6 (-550 + x (-443963 + 235201 x)) +
       2 k^10 (-1 + x)^5 (-10945 + x (75985 + x (-906523 + 487927 x))) +
       2 k^2 x^5 (353556 + x (-273280 + x (-557258 + 487927 x))) + 4 k^6 (-1 + x) x
        (-168418 + (-1 + x) x (-476296 + (-1 + x) x (346861 + 1655413 (-1 + x) x))) -
       5 k^3 x^4 (-282331 + x (438137 + x (341729 + x (-1035337 + 498297 x)))) -
       5 k^9 (-1 + x)^4 (-39505 + x (-8772 + x (225500 + x (-957851 + 498297 x)))) +
       20 k^4 x^3 (85379 + x (-199689 + x (-23569 + x (560189 + 11 x (-58191 + 20203 x))))) + 20
        k^8 (-1 + x)^3 (-4442 + x (-15499 + x (-38722 + x (222115 + 11 x (-42824 + 20203 x))))) +
       k^5 x^2 (1427274 + x (-4230511 + 2 x (872810 + x (6586595 + x (-13525745 +
                (10584551 - 3015409 x) x))))) - k^7 (-1 + x)^2 (-202367 + x (234941 +
             2 x (-92500 + x (-1979055 + x (5834125 + x (-7507903 + 3015409 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 (17267 + k (-21021 + k (15543 + k (-6983 +
             k (14973 + k (25929 + k (-16843 + 10335 k))))))) x + (-1 + k)^2 k^5 (40814 +
          k (-38829 + k (11524 + k (44317 + k (9938 + k (88291 + k (-59476 + 33761 k))))))) x^2 -
       (-1 + k)^3 k^4 (46410 + k (-31846 + k (-1865 + k (138739 +
             k (-36884 + k (173044 + 13 k (-9125 + 4823 k))))))) x^3 +
       (-1 + k)^4 k^3 (40306 + k (-994 + k (-37264 + k (190331 + k (-92344 + 5 k (42550 +
                k (-29230 + 14469 k))))))) x^4 - (-1 + k)^5 k^2 (19292 + k (11438 + k
            (-58254 + k (155082 + k (-97575 + k (167361 + k (-113837 + 53053 k))))))) x^5 +
       (-1 + k)^6 k (5512 + k (11044 + k (-38486 + k (78060 + k (-56266 +
             k (81919 + k (-54688 + 24115 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]]
```

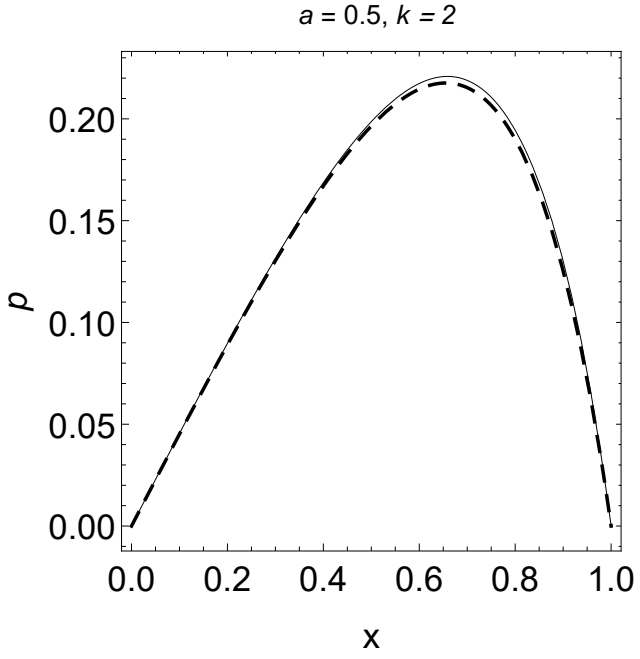
Out[57]=

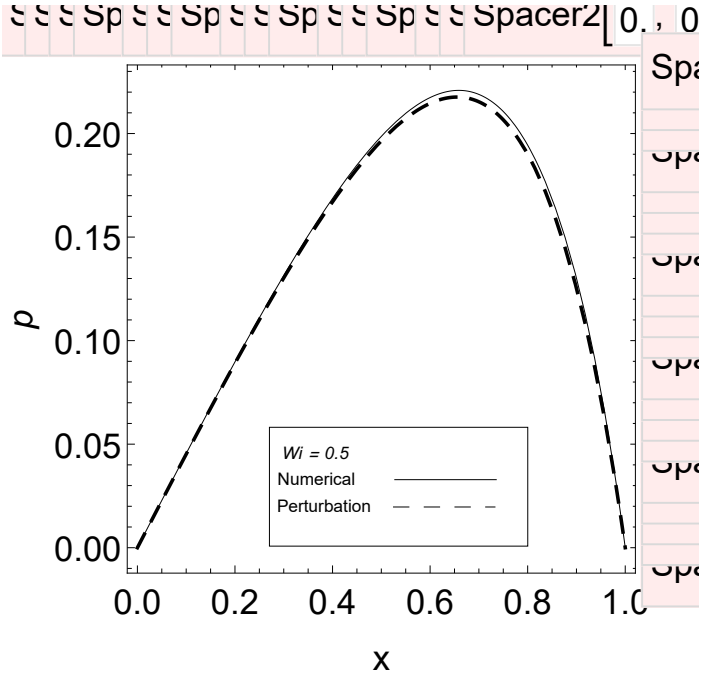


In[58]:= **u2 =**  **;**

In[59]:=
```
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]
```

Out[59]=

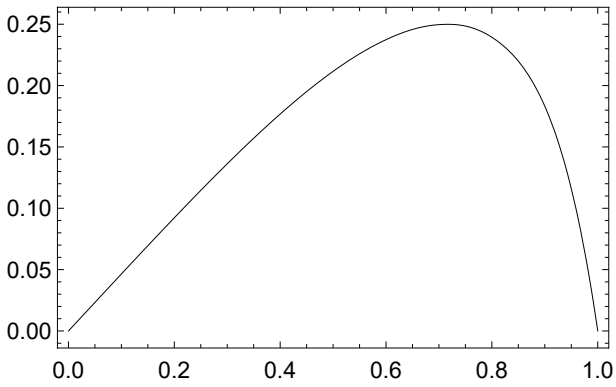



0.20
0.15
0.10
0.05
0.00
p
0.0
0.2
0.4
0.6
0.8
x
Wi = 0.5
Numerical
Perturbation

In[60]:=
```
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 → {"", "", " ν ", ""}, FrameStyle → Directive[Thin],
  LabelStyle → Directive[18], Epilog → {Arrow[{{}, {}}], Text[""]}];
```

Out[72]= {0.0000486587}

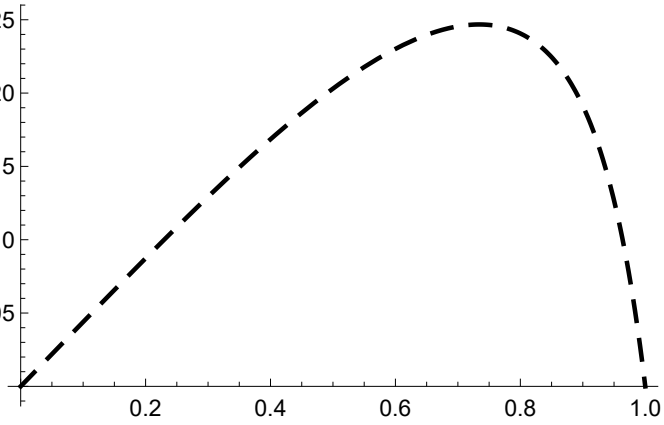
Out[73]=



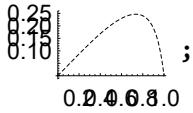
In[76]:= **u22 =** cer2[0. , 0.]
0.26 • Spacer2[0 ;

In[77]:=
```
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/(30625 k^3 (1 + k)^5 (k + x - k x)^10) 8 b^4 (-1 + k) (-1 + x) x
   (9 (-1 + k)^2 (26164 k^12 (-2 + x) (-1 + x)^7 + 26164 x^7 (1 + x) +
       k x^6 (209312 + (26439 - 235201 x) x) - k^11 (-1 + x)^6 (-550 + x (-443963 + 235201 x)) +
       2 k^10 (-1 + x)^5 (-10945 + x (75985 + x (-906523 + 487927 x))) +
       2 k^2 x^5 (353556 + x (-273280 + x (-557258 + 487927 x))) + 4 k^6 (-1 + x) x
        (-168418 + (-1 + x) x (-476296 + (-1 + x) x (346861 + 1655413 (-1 + x) x))) -
       5 k^3 x^4 (-282331 + x (438137 + x (341729 + x (-1035337 + 498297 x)))) -
       5 k^9 (-1 + x)^4 (-39505 + x (-8772 + x (225500 + x (-957851 + 498297 x)))) +
       20 k^4 x^3 (85379 + x (-199689 + x (-23569 + x (560189 + 11 x (-58191 + 20203 x))))) + 20
        k^8 (-1 + x)^3 (-4442 + x (-15499 + x (-38722 + x (222115 + 11 x (-42824 + 20203 x))))) +
       k^5 x^2 (1427274 + x (-4230511 + 2 x (872810 + x (6586595 + x (-13525745 +
                (10584551 - 3015409 x) x))))) - k^7 (-1 + x)^2 (-202367 + x (234941 +
             2 x (-92500 + x (-1979055 + x (5834125 + x (-7507903 + 3015409 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 (17267 + k (-21021 + k (15543 + k (-6983 +
             k (14973 + k (25929 + k (-16843 + 10335 k))))))) x + (-1 + k)^2 k^5 (40814 +
          k (-38829 + k (11524 + k (44317 + k (9938 + k (88291 + k (-59476 + 33761 k))))))) x^2 -
       (-1 + k)^3 k^4 (46410 + k (-31846 + k (-1865 + k (138739 +
             k (-36884 + k (173044 + 13 k (-9125 + 4823 k))))))) x^3 +
       (-1 + k)^4 k^3 (40306 + k (-994 + k (-37264 + k (190331 + k (-92344 + 5 k (42550 +
                k (-29230 + 14469 k))))))) x^4 - (-1 + k)^5 k^2 (19292 + k (11438 + k
            (-58254 + k (155082 + k (-97575 + k (167361 + k (-113837 + 53053 k))))))) x^5 +
       (-1 + k)^6 k (5512 + k (11044 + k (-38486 + k (78060 + k (-56266 +
             k (81919 + k (-54688 + 24115 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]]
```

Out[85]=

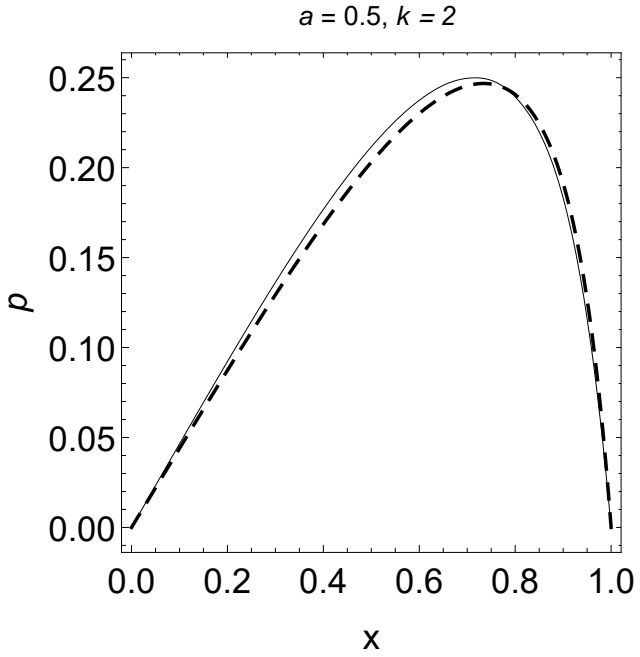


In[86]:=
```
u33 = ;
```

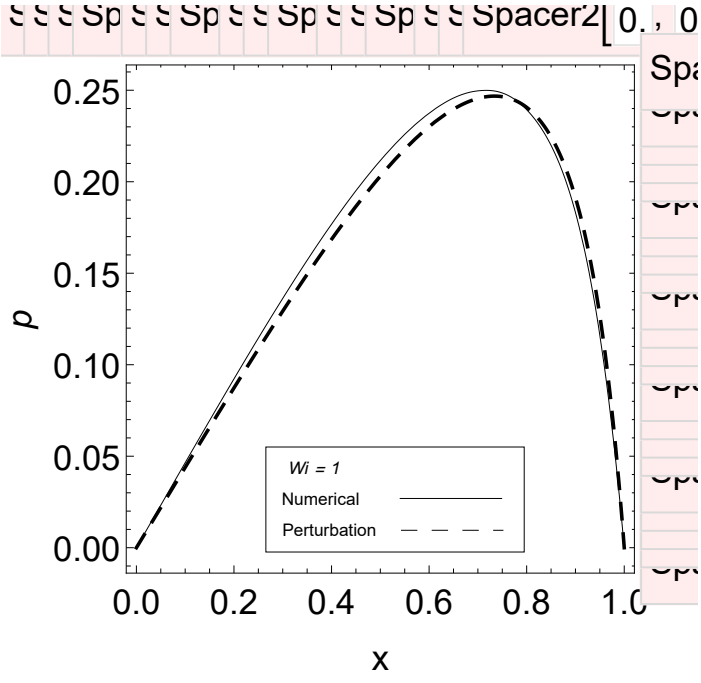


In[87]:=
```
Show[{u22, u33}, Frame → True, PlotRange → All, LabelStyle → Directive[Black, 18],
 AspectRatio → 1, FrameLabel → {"x", "p", " a = 0.5, k = 2", ""},
 FrameStyle → Directive[Thin], LabelStyle → Directive[Black, 18], Axes → False]
```

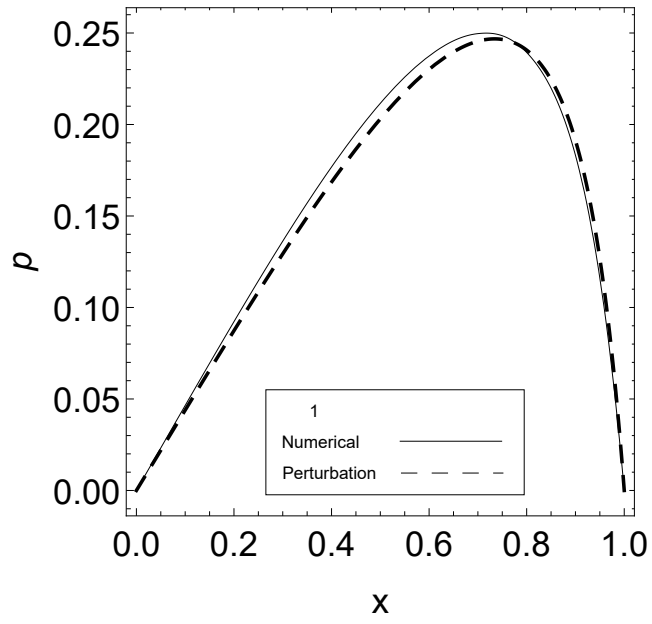
Out[87]=



In[88]:=


p
x
Wi = 1
Numerical
Perturbation
a = 0.5, k = 2

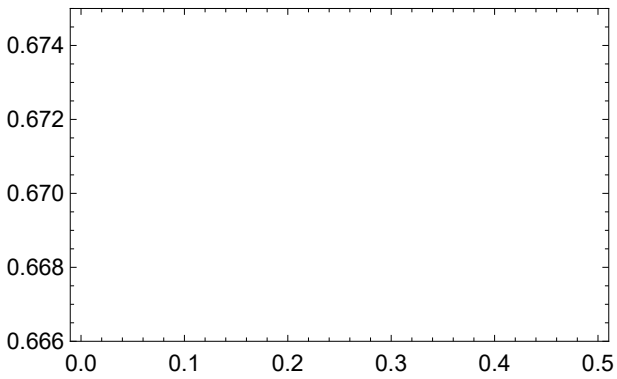
Out[88]=


p
x
1
Numerical
Perturbation

In[89]:=
```
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[95]= 0.662893

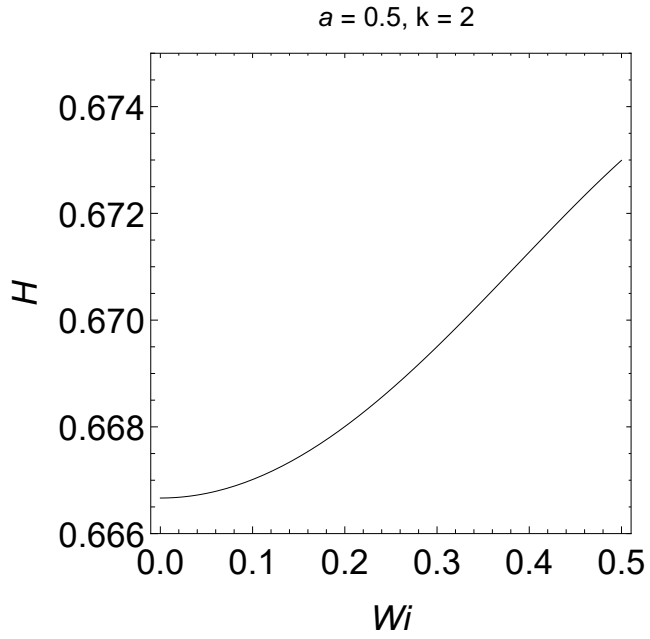
Out[96]=

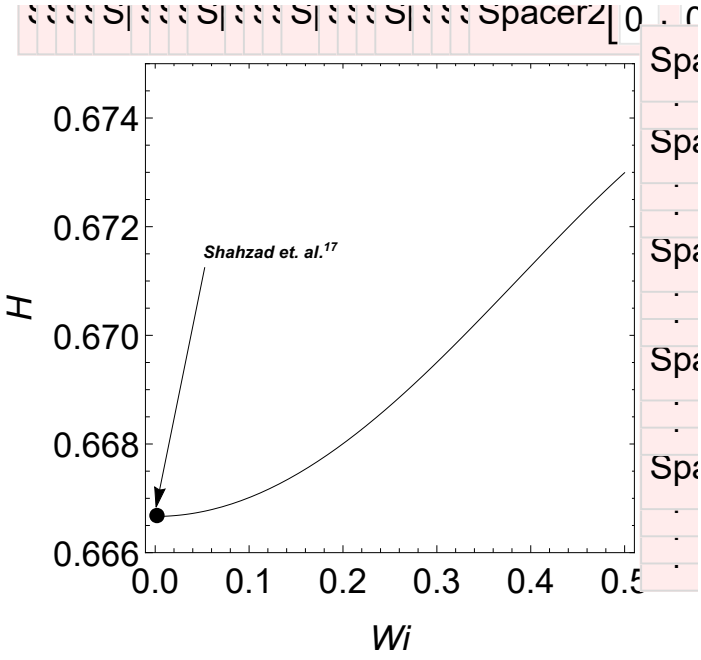


In[97]:=
```
n1 = Spacer2[ 0. , 0. ];
```

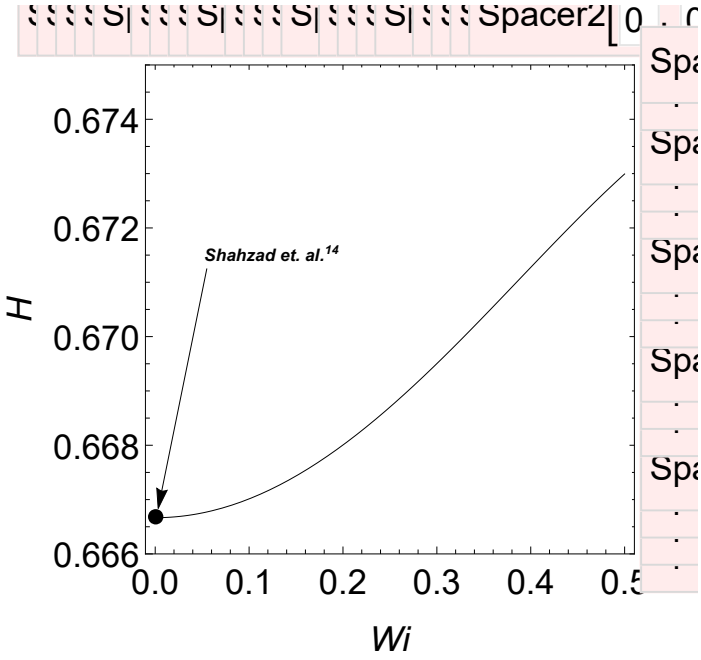
In[98]:=
```
Show[{n1}, Frame → True, PlotRange → {.666, .675}, LabelStyle → Directive[Black, 18],
 AspectRatio → 1, FrameLabel → {"Wi", "H", " a = 0.5, k = 2", ""},
 FrameStyle → Directive[Thin], LabelStyle → Directive[Black, 18], Axes → False]
```

Out[98]=



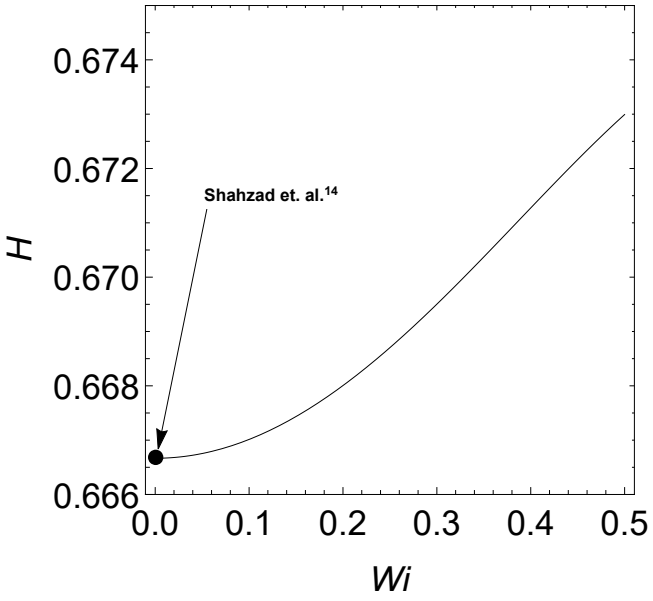


In[99]:=



a = 0.5, k = 2

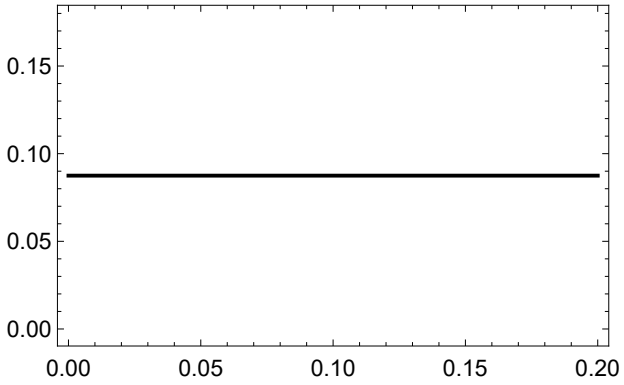
Out[99]=



In[100]:=

In[101]:=
```
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/(30625 k^3 (1 + k)^5 (k + x - k x)^10) 8 b^4 (-1 + k) (-1 + x) x
   (9 (-1 + k)^2 (26164 k^12 (-2 + x) (-1 + x)^7 + 26164 x^7 (1 + x) +
       k x^6 (209312 + (26439 - 235201 x) x) - k^11 (-1 + x)^6 (-550 + x (-443963 + 235201 x)) +
       2 k^10 (-1 + x)^5 (-10945 + x (75985 + x (-906523 + 487927 x))) +
       2 k^2 x^5 (353556 + x (-273280 + x (-557258 + 487927 x))) + 4 k^6 (-1 + x) x
        (-168418 + (-1 + x) x (-476296 + (-1 + x) x (346861 + 1655413 (-1 + x) x))) -
       5 k^3 x^4 (-282331 + x (438137 + x (341729 + x (-1035337 + 498297 x)))) -
       5 k^9 (-1 + x)^4 (-39505 + x (-8772 + x (225500 + x (-957851 + 498297 x)))) +
       20 k^4 x^3 (85379 + x (-199689 + x (-23569 + x (560189 + 11 x (-58191 + 20203 x))))) + 20
        k^8 (-1 + x)^3 (-4442 + x (-15499 + x (-38722 + x (222115 + 11 x (-42824 + 20203 x))))) +
       k^5 x^2 (1427274 + x (-4230511 + 2 x (872810 + x (6586595 + x (-13525745 +
                (10584551 - 3015409 x) x))))) - k^7 (-1 + x)^2 (-202367 + x (234941 +
             2 x (-92500 + x (-1979055 + x (5834125 + x (-7507903 + 3015409 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 (17267 + k (-21021 + k (15543 + k (-6983 +
             k (14973 + k (25929 + k (-16843 + 10335 k))))))) x + (-1 + k)^2 k^5 (40814 +
          k (-38829 + k (11524 + k (44317 + k (9938 + k (88291 + k (-59476 + 33761 k))))))) x^2 -
        (-1 + k)^3 k^4 (46410 + k (-31846 + k (-1865 + k (138739 +
             k (-36884 + k (173044 + 13 k (-9125 + 4823 k))))))) x^3 +
       (-1 + k)^4 k^3 (40306 + k (-994 + k (-37264 + k (190331 + k (-92344 + 5 k (42550 +
                k (-29230 + 14469 k))))))) x^4 - (-1 + k)^5 k^2 (19292 + k (11438 + k
            (-58254 + k (155082 + k (-97575 + k (167361 + k (-113837 + 53053 k))))))) x^5 +
       (-1 + k)^6 k (5512 + k (11044 + k (-38486 + k (78060 + k (-56266 +
             k (81919 + k (-54688 + 24115 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[""]}]
```

Out[109]=



In[110]:= **o3 =** cer2[0. , 0.] Spacer2[0];

In[111]:= **o2 =** cer2[0. , 0.] Spacer2[0];

In[112]:= **o1 =** cer2[0. , 0.] Spacer2[0];

In[113]:=
```
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[113]=