

DATA

MAILLAGE RAFFINÉ - AVEC TEST D'ARRET- 4 novembre 2011 - p=2.8, d=5
i, kappa, Lambda (kappa), J(Lambda (kappa)), L2/2, L2gradient/2, Lp/2

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{18, 16.9106, -4.60286, 16.9106, 19.7392, 37.7716, 22.5976},
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Valeurs pour $p = 2.8$, $d = 5$, maille adaptative - 8 Novembre 2011
 i , κ , $\Lambda(\kappa)$, $J(\Lambda(\kappa))$, L_2 , L_2 gradient, L_p
 Valeurs de $\Lambda < 5$

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Valeurs pour $p = 2.8$, $d = 5$, maille adaptative - 8 Novembre 2011
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 Valeurs de $\Lambda > 5$

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Valeurs pour $p = 2.7$, $d = 5$

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 {96, 15.4531, 4.10482, 15.4531, 15.4529, 39.4784, 27.2168, 33.3646},
 {97, 15.2031, 4.02751, 15.2031, 15.2031, 39.4784, 26.5, 33.1875},
 {98, 14.9531, 3.95036, 14.9531, 14.9531, 39.4784, 25.9885, 33.0586},
 {99, 14.7023, 3.87342, 14.7023, 14.7023, 39.4784, 25.4789, 32.9304},
 {100, 14.453, 3.7967, 14.453, 14.453, 39.4784, 24.9812, 32.7985},
 {101, 14.2017, 3.72019, 14.2017, 14.2017, 39.4784, 24.4739, 32.6686},
 {102, 13.9531, 3.64393, 13.9531, 13.9531, 39.4784, 23.9743, 32.5299},
 {103, 13.7018, 3.56787, 13.7018, 13.7019, 39.4784, 23.4768, 32.3978},
 {104, 13.4524, 3.49206, 13.4524, 13.4524, 39.4784, 22.9666, 32.2542},
 {105, 13.203, 3.41648, 13.203, 13.203, 39.4784, 22.48, 32.1144},
 {106, 12.9529, 3.34114, 12.9529, 12.9529, 39.4784, 21.9799, 31.9706},
 {107, 12.7025, 3.26603, 12.7025, 12.7025, 39.4784, 21.4947, 31.8299},
 {108, 12.453, 3.19117, 12.453, 12.453, 39.4784, 20.9934, 31.6782},
 {109, 12.2026, 3.11656, 12.2026, 12.2027, 39.4784, 20.5088, 31.532},
 {110, 11.9526, 3.04221, 11.9526, 11.9526, 39.4784, 20.0106, 31.3777},

```
{111, 11.7029, 2.96811, 11.7029, 11.7029, 39.4784, 19.5347, 31.2259},
{112, 11.4533, 2.89428, 11.4533, 11.4533, 39.4784, 19.0411, 31.0651},
{113, 11.2026, 2.82071, 11.2026, 11.2026, 39.4784, 18.5647, 30.9108},
{114, 10.9526, 2.74742, 10.9526, 10.9526, 39.4784, 18.075, 30.7459},
{115, 10.7032, 2.67441, 10.7032, 10.7032, 39.4784, 17.5969, 30.5795},
{116, 10.4529, 2.60168, 10.4529, 10.4529, 39.4784, 17.1151, 30.4116},
{117, 10.2032, 2.52924, 10.2032, 10.2032, 39.4784, 16.6427, 30.2405},
{118, 9.95282, 2.45709, 9.95282, 9.95283, 39.4784, 16.1658, 30.0669},
{119, 9.70281, 2.38525, 9.70281, 9.70282, 39.4784, 15.6967, 29.8905},
{120, 9.45326, 2.31371, 9.45326, 9.45327, 39.4784, 15.2212, 29.7052},
{121, 9.20268, 2.24248, 9.20268, 9.20269, 39.4784, 14.7587, 29.5251},
{122, 8.95209, 2.17157, 8.95209, 8.95211, 39.4784, 14.2927, 29.339},
{123, 8.70313, 2.10101, 8.70313, 8.70314, 39.4784, 13.8193, 29.1375},
{124, 8.45333, 2.03077, 8.45333, 8.45333, 39.4784, 13.3621, 28.9413}};
```

Freefem paper

Definitions

```
ac[d_] :=  $\frac{d-2}{2}$ 

Theta[p_, d_] := d  $\frac{p-2}{2p}$ 

S[d_] :=  $\frac{2\pi^{\frac{d}{2}}}{\Gamma[\frac{d}{2}]}$ 

μFS[d_, p_] :=  $\frac{4(d-1)}{p^2-4}$ 

Cstar[p_, d_, λ_, θ_] :=

S[d]  $^{-\frac{p-2}{p}} \left( \frac{(p-2)^2}{2+(2\theta-1)p} \right)^{\frac{p-2}{2p}} \left( \frac{2+(2\theta-1)p}{2p\theta} \right)^{\theta} \left( \frac{4}{p+2} \right)^{\frac{6-p}{2p}} \left( \frac{\Gamma[\frac{2}{p-2} + \frac{1}{2}]}{\sqrt{\pi} \Gamma[\frac{2}{p-2}]} \right)^{\frac{p-2}{p}} \lambda^{\frac{p-2}{2p}-\theta}$ 

Lambda[θ_, Lst_, n_] := θ Abs[Lst[[n]][[3]]] - (1-θ)  $\frac{\text{Lst}[[n]][[6]]}{\text{Lst}[[n]][[5]]}$ 

Energy[p_, θ_, Lst_, n_] :=  $\frac{1}{\text{Lst}[[n]][[7]]^{\frac{2}{p}}}$ 

(Lst[[n]][[6]] + Lambda[θ, Lst, n] Lst[[n]][[5]])θ Lst[[n]][[5]]1-θ
PlotTable[Lst_, n1_, n2_] :=
ListLinePlot[Table[{Abs[Lst[[n]][[n1]]], Lst[[n]][[n2]]}, {n, 1, Length[Lst]}],
PlotStyle → Directive[Black, Thickness[0.005]]]

Constante = 2- $\frac{p-2}{p}$  /. p → 2.8;
θ0 = Theta[2.8, 5];
θList = {0.72, 0.75, 0.8, 0.85, 0.9, 0.95, 1};
PlotTableEnergyTheta[p_, θ_, Lst_] :=
ListLinePlot[Table[{Lambda[θ, Lst, n], Energy[p, θ, Lst, n]}, {n, 1, Length[Lst]}],
PlotStyle → Directive[Black, Thickness[0.005]]]
```

```

Lambdabis[θ_, Lst_, n_] := θ Abs[Lst[[n]][[3]]] - (1 - θ)  $\frac{\text{Lst}[[n]][[7]]}{\text{Lst}[[n]][[6]]}$ 

Energybis[p_, θ_, Lst_, n_] :=  $\frac{1}{\text{Lst}[[n]][[8]]^{\frac{2}{p}}}$ 

(Lst[[n]][[7]] + Lambdabis[θ, Lst, n] Lst[[n]][[6]])^θ Lst[[n]][[6]]^{1-θ}

Lambdastarl[p_, θ_, mu_] := θ mu - (1 - θ) mu  $\frac{p-2}{p+2}$ ;

PlotTableEnergyThetabis[p_, θ_, Lst_] := ListLinePlot[
  Table[{Lambdabis[θ, Lst, n], Energybis[p, θ, Lst, n]}, {n, 1, Length[Lst]}],
  PlotStyle → Directive[Thickness[0.005], Black]]

LL[h_, l_] := ListLinePlot[{{0, h}, {1, h}}, PlotStyle → {Thickness[0.001], Black}]
HH[h_, l_] := ListLinePlot[{{1, 0}, {1, h}}, PlotStyle → {Thickness[0.001], Black}]

```

Figure 1

```

Psym1a = Plot[ $\frac{1}{\text{Cstar}[2.8, 5, \lambda, 1]}$ , {λ, 5, 20},
  PlotStyle → {Thickness[0.005], Opacity[0.6], Dashed, Black}];

Psym1b = Plot[ $\frac{1}{\text{Cstar}[2.8, 5, \lambda, 1]}$ , {λ, 0, 5}, PlotStyle → {Thickness[0.005], Black}];

Show[Psym1a, Psym1b, HH[22, 4.16], LL[15.6523, 7], PlotTable[L811a, 3, 4],
  PlotTable[L811b, 3, 4], PlotRange → {{0, 100}, {0, 52}}, AxesOrigin → {0, 0}]
μFS[5, 2.8]
1 / Cstar[2.8, 5, %, 1]

```

4.16667

15.6523

```

Psym1 = Show[Table[Plot[ $\frac{\text{Constante}}{\text{Cstar}[2.8, 5, \lambda, \theta\text{List}[[i]]]}$ , {\lambda, 0, 20},
    PlotStyle -> {Thickness[0.005], Opacity[0.6], Dashed, Black}], {i, 1, 7}]]];

Psym2 = Show[Table[Plot[ $\frac{\text{Constante}}{\text{Cstar}[2.8, 5, \lambda, \theta\text{List}[[i]]]}$ ,
    {\lambda, 0, 2.5}, PlotStyle -> {Thickness[0.005], Black}], {i, 1, 7}]]];

Show[Table[Show[Psym1, Psym2, PlotTableEnergyTheta[2.8, \theta\text{List}[[i]], L411a],
    DisplayFunction -> Identity], {i, 1, 7}], Table[
    Show[PlotTableEnergyTheta[2.8, \theta\text{List}[[i]], L411bSorted], DisplayFunction -> Identity],
    {i, 1, 7}], DisplayFunction -> $DisplayFunction,
    PlotRange -> {{0, 6}, {0, 18}}, AspectRatio -> 1]

```

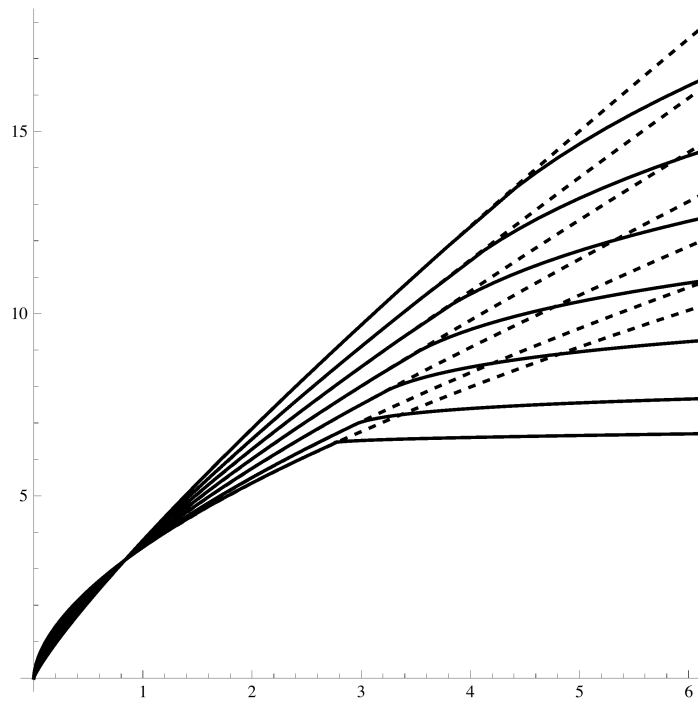


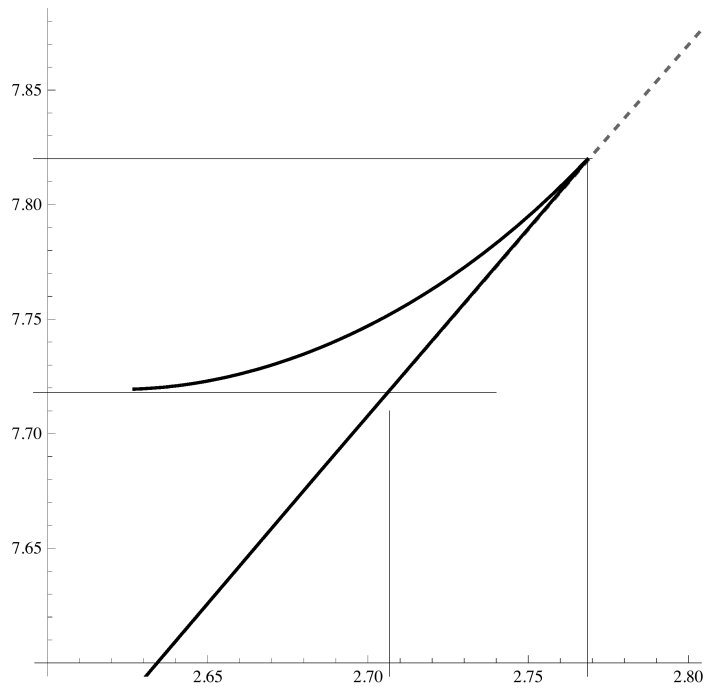
Figure 2

```

P280new = PlotTableEnergyThetabis[2.8, Theta[2.8, 5], LL280err12moinspremierterme];
P280star = Plot[ $\frac{1}{\text{Cstar}[2.8, 5, \lambda, \text{Theta}[2.8, 5]]}$ , {\lambda, 0, 4},
  PlotStyle -> {Thickness[0.005], Opacity[0.6], Dashed, Black}];

Show[P280star, P280new, HH [7.71, 2.7067],
  HH [7.82, 2.7685], LL[7.718, 2.74], LL[7.82, 2.77],
  PlotRange -> {{2.6, 2.8}, {7.6, 7.88}}, AspectRatio -> 1, AxesOrigin -> {2.6, 7.6}]

```



```

TT280d5280err12 = Table[{Lambdabis[Theta[2.80, 5], LL280err12, n],
  Energybis[2.80, Theta[2.80, 5], LL280err12, n], n}, {n, 1, Length[LL280err12]};
PPP280d5280err12 = ListLinePlot[Table[{LL280err12[[n]][[3]],
  TT280d5280err12[[n]][[1]]}, {n, 10, Length[LL280err12] - 15}],
  PlotRange -> {{2, 30}, {2.2, 2.8}}, AxesOrigin -> {2, 2.2},
  PlotStyle -> {Thickness[0.005], Black}];
Show[PPP280d5280err12, Plot[Lambdastar1[2.80, Theta[2.80, 5], mu],
  {mu, 3.5, 4.5}, PlotStyle -> {Thickness[0.005], Opacity[0.6], Dashed, Black}],
  LL[2.613, 30], LL[2.7067, 7.71], LL[2.7685, 6], HH[2.7, 4.3],
  PlotRange -> {{3.1, 15}, {2.5, 2.85}}, AspectRatio -> 1, AxesOrigin -> {3.1, 2.5}]

```

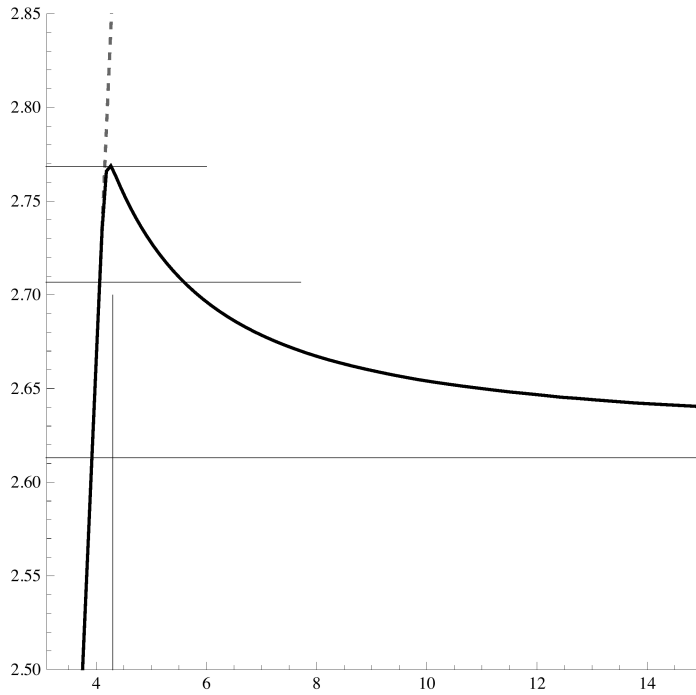
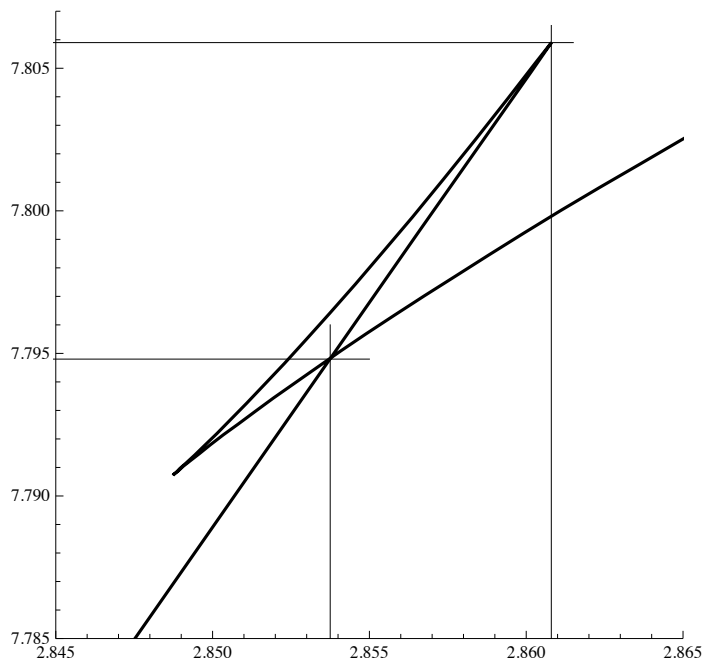


Figure 3

```

TT278d5280new = Table[{Lambdabis[Theta[2.80, 5], LL278new, n],
  Energybis[2.78, Theta[2.80, 5], LL278new, n], n}, {n, 1, Length[LL278new]};
PPP278280NoTicks = ListLinePlot[Table[{Abs[TT278d5280new[[n]][[1]]],
  TT278d5280new[[n]][[2]]}, {n, 5, Length[LL278new]}],
  PlotRange → {{2.845, 2.865}, {7.785, 7.807}},
  PlotStyle → {Thickness[0.005], Black}, AspectRatio → 1];
Show[PPP278280NoTicks, LL[7.7948, 2.855], LL[7.8059, 2.8615],
  HH[7.796, 2.85375], HH[7.8065, 2.8608]]

```



```

PPP278280Ticks = ListLinePlot[Table[{LL278new[[n]][[3]], TT278d5280new[[n]][[1]]},
  {n, 2, Length[LL278new]}], PlotStyle → {Thickness[0.005], Black};
PPP278280TicksStar = Plot[Lambdastar1[2.78, Theta[2.80, 5], mu], {mu, 3.1, 5},
  PlotStyle → {Thickness[0.005], Opacity[0.6], Dashed, Black};
Show[PPP278280Ticks, PPP278280TicksStar, LL[2.8515, 6], LL[2.861, 4.5],
  HH[2.86, 5.615], HH[2.848, 5.18], PlotRange → {{4, 8}, {2.8, 2.9}},
  Axes → True, AxesOrigin → {4, 2.8}, AspectRatio → 1]

```

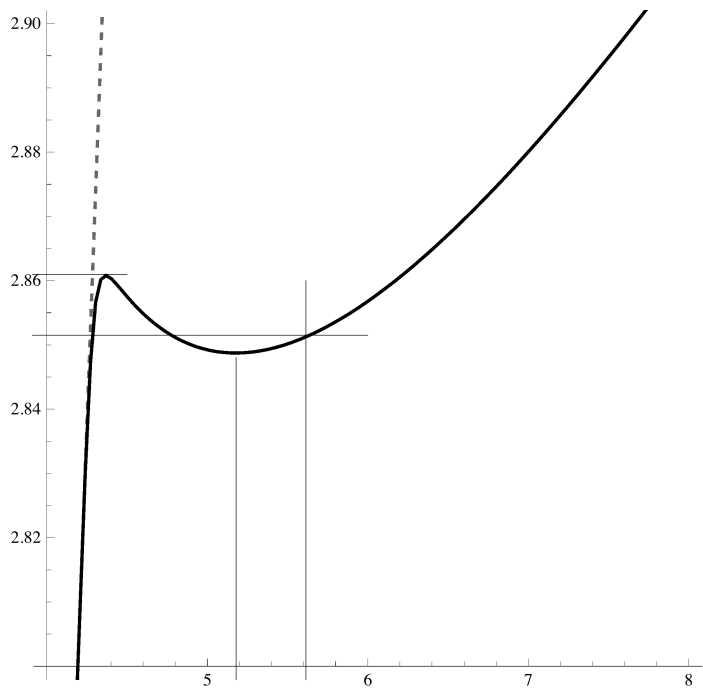


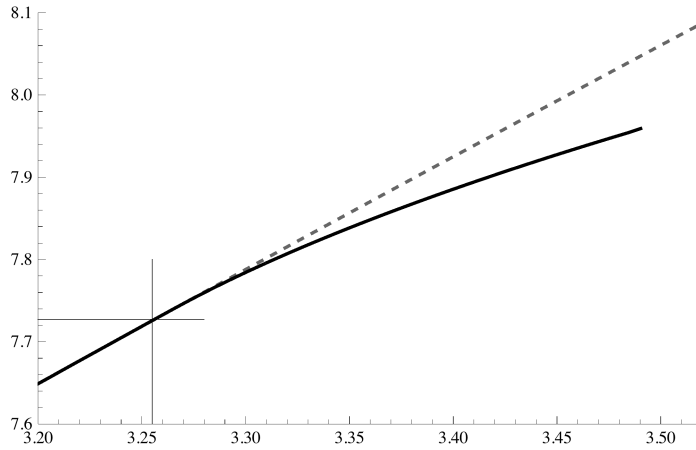
Figure 6

```

TT270d5280err12 = Table[{Lambdabis[Theta[2.80, 5], LL270err12, n],
  Energybis[2.70, Theta[2.80, 5], LL270err12, n], n}, {n, 1, Length[LL270err12]};
PPP270d5280 = ListLinePlot[Table[{TT270d5280err12[[n]][[1]],
  TT270d5280err12[[n]][[2]]}, {n, 1, Length[LL270err12]}], PlotRange → All,
  AxesOrigin → {2.5, 2.3}, PlotStyle → {Thickness[0.005], Black}];

PPP270d5280star = Plot[ $\frac{1}{\text{Cstar}[2.70, 5, \lambda, \text{Theta}[2.80, 5]]}$ , {\lambda, 2.7, 5.5},
  PlotStyle → {Thickness[0.005], Opacity[0.6], Dashed, Black}];
Show[PPP270d5280, PPP270d5280star, HH[7.8, 3.255], LL[7.7273, 3.28],
  PlotRange → {{3.2, 3.52}, {7.6, 8.1}}, AxesOrigin → {3.2, 7.6}]

```



```

PPP270d5280err12 = ListLinePlot[Table[
  {LL270err12[[n]][[3]], TT270d5280err12[[n]][[1]]}, {n, 1, Length[LL270err12]}],
  PlotRange → All, AxesOrigin → {3, 2.3}, PlotStyle → {Thickness[0.005], Black}];
Show[PPP270d5280err12, Plot[Lambdastar1[2.70, Theta[2.80, 5], mu], {mu, 3, 8},
  PlotStyle → {Thickness[0.005], Opacity[0.6], Dashed, Black}], LL[3.255, 5],
  HH[3.3, 4.85], PlotRange → {{3.7, 6.2}, {2.7, 3.6}}, AxesOrigin → {3.7, 2.7}]

```

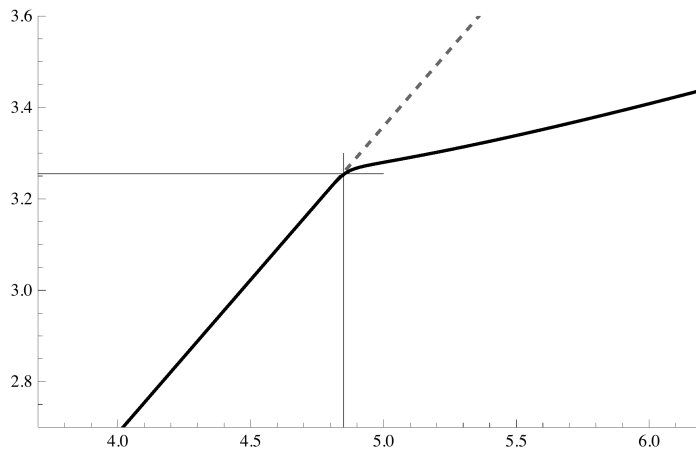


Figure 7

```

 $\theta$ Listerr12 = {Theta[2.8, 5], Theta[2.8, 5] + 0.007,
  Theta[2.8, 5] + 0.014, 0.75, 0.8, 0.85, 0.9, 0.95, 1};
 $\theta$ Listerr12f = {Theta[2.8, 5], Theta[2.8, 5] + 0.01,};
Show[Table[
  Show[PlotTableEnergyThetabis[2.8,  $\theta$ Listerr12[[i]], LL280err12moinspremierterme],
    DisplayFunction -> Identity], {i, 1, 3}], Table[
  Show[PlotTableEnergyThetabis[2.8,  $\theta$ Listerr12[[i]], LL280err12moinspremierterme],
    DisplayFunction -> Identity], {i, 1, 3}], DisplayFunction -> $DisplayFunction,
  PlotRange -> {{2.5, 2.9}, {7.5, 8.12}}, AxesOrigin -> {2.5, 7.5}]

```

