Los valores de las constantes son:

```
ρ = -0.01
S0 = 81
σ = 0.09
r = 0.08
```

```
-0.01
```

```
81
```

```
0.09
```

```
0.08
```

La solución exacta es :

```
U[S_, t_] := S - Sqrt[S0]/ρ (Sqrt[S] Exp[(r + σ^2/4) * t]/2 + Sqrt[S0] Exp[(r + σ^2/4) * t]/4)
```

```
U[S, t]
```

$$900.\left(\frac{9\, e^{0.082025\, t}}{4}+e^{0.0410125\, t}\sqrt{S}\right)+S$$

```
900 * 2.44234
```

```
2198.11
```

Observamos para el caso donde t=0

```
U[S, 0]
```

$$900.\left(2.25+1.\sqrt{S}\right)+S$$

Como podemos observar coinside con el u0 de ADM.

```
u0[x_, t_] :=
 19.05 + 12.11 * x + 6.09 * x * x + 8.07 x * x * x + .24 x * x * x * x + .21 * x * x * x * x * x
```

```
u0[x, t]
```

$$19.05+12.11\, x+6.09\, x^2+8.07\, x^3+0.24\, x^4+0.21\, x^5$$

```
A0[S, t] := (D[D[u0[S, t], S], S])^2
```

```
A0[S, t]
```

$$\left(12.18+48.42\, S+2.88\, S^2+4.2\, S^3\right)^2$$

```
u1[S_, t_] :=
 -Integrate[-1 / 2 * σ^2 * S^2 * D[D[u0[S, t], S], S] + r * S * D[u0[S, t], S] - r, t] -
  ρ * σ^2 * (Integrate[-S^3 * A0[S, t], t])
```

```
u1[S, t]
```

$$-4.10063\,t-\left(-0.08+0.91125\,\sqrt{S}+0.08\left(1+\frac{450}{\sqrt{S}}\right)S\right)t$$

```
A1[S, t] := 2 * (D[D[u0[S, t], S], S]) * (D[D[u1[S, t], S], S])
```

```
A1[S, t]
```

$$-\frac{4152.52\,t}{S^3}$$

```
u2[S_, t_] :=
 -Integrate[-1 / 2 * σ^2 * S^2 * D[D[u1[S, t], S], S] + r * S * D[u1[S, t], S] - r, t] -
  ρ * σ^2 * (Integrate[-S^3 * A1[S, t], t])
```

```
u2[S, t]
```

$$0.08\,t+0.168177\,t^2+0.756911\,\sqrt{S}\,t^2+0.0032\,S\,t^2$$

```
A2[S, t] := 2 * (D[D[u0[S, t], S], S]) * (D[D[u2[S, t], S], S]) + (D[D[u1[S, t], S], S]) ^2
```

```
A2[S, t]
```

$$\frac{170.305\,t^2}{S^3}$$

```
u3[S_, t_] :=
 -Integrate[-1 / 2 * σ^2 * S^2 * D[D[u2[S, t], S], S] + r * S * D[u2[S, t], S] - r, t] -
  ρ * σ^2 * (Integrate[-S^3 * A2[S, t], t])
```

```
u3[S, t]
```

$$0.08\,t-0.00459824\,t^3-0.0103476\,\sqrt{S}\,t^3-0.0000853333\,S\,t^3$$

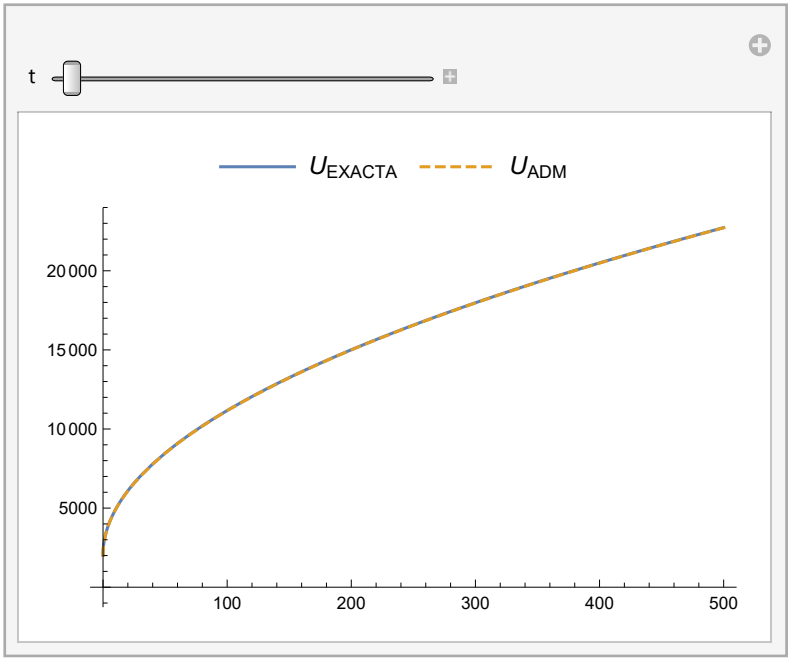
```
u[S_, t_] := u0[S, t] + u1[S, t] + u2[S, t] + u3[S, t]
```

```
u[S, t]
```

$$2025+900\,\sqrt{S}+S-3.94063\,t-\left(-0.08+0.91125\,\sqrt{S}+0.08\left(1+\frac{450}{\sqrt{S}}\right)S\right)t+0.168177\,t^2+0.756911\,\sqrt{S}\,t^2+0.0032\,S\,t^2-0.00459824\,t^3-0.0103476\,\sqrt{S}\,t^3-0.0000853333\,S\,t^3$$

```
uA[S_, t_] := u[S, t]
```

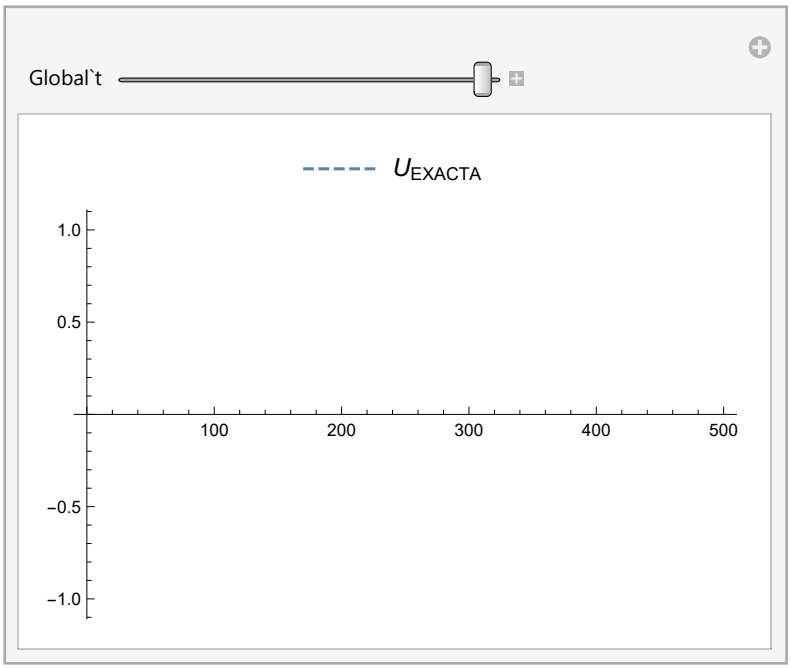
```
Manipulate[Plot[{900.` (9 E^(0.082025` * t)/4 + E^(0.0410125` * t) Sqrt[S]) + S, 2025 + 900 Sqrt[S] + S -
    (-3.940625` t - (-0.08` + 0.91125` Sqrt[S] + 0.08` (1 + 450/Sqrt[S]) S) t + 0.1681768828125` t^2 +
     0.7569113203125` Sqrt[S] t^2 + 0.0032` S t^2 - 0.004598236270898439` t^3 -
     0.010347608508105469` Sqrt[S] t^3 - 0.00008533333333333334` S t^3)},
  {S, 0, 500}, PlotLegends → Placed[{"U_EXACTA", "U_ADM"}, Above],
  PlotStyle → {Triangle, Dashed},
  AxesOrigin → {0, 0}], {t, 0, 10}]
```

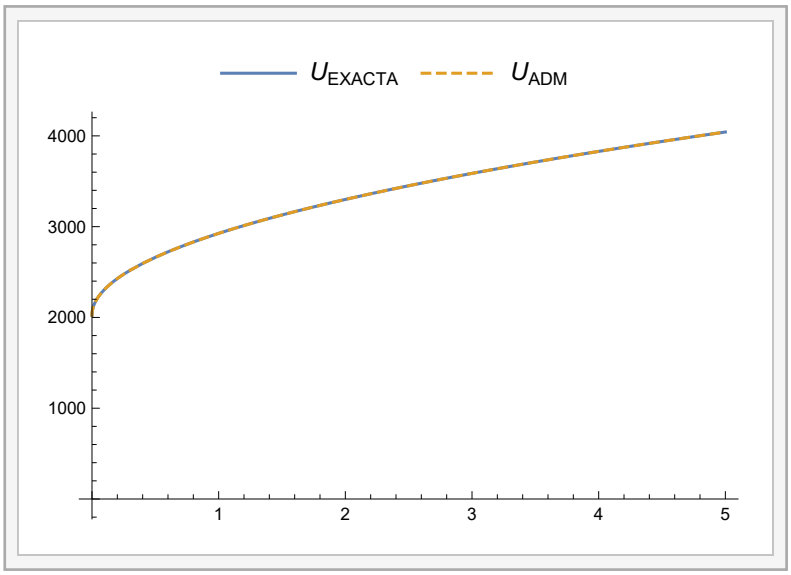



```
uA[S, t]
```

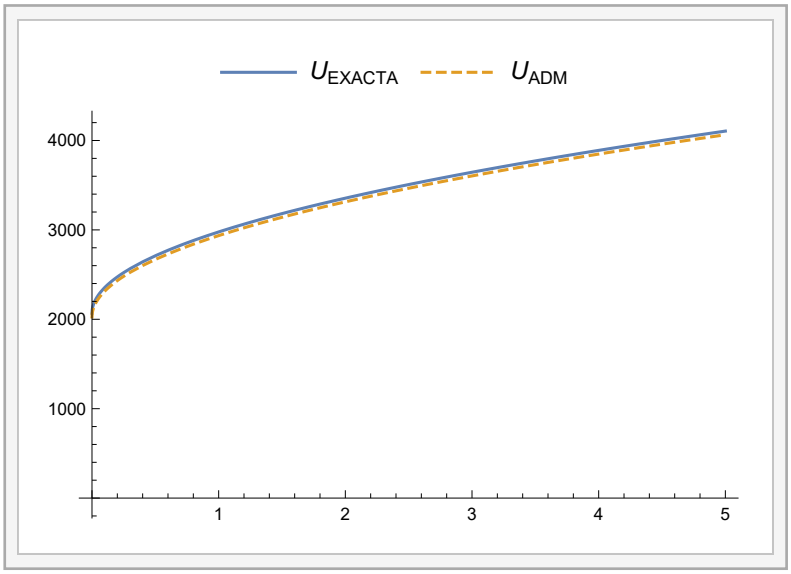
$$2025 + 900\sqrt{S} + S - 3.94063\,t - \left(-0.08 + 0.91125\sqrt{S} + 0.08\left(1 + \frac{450}{\sqrt{S}}\right)S\right)t + 0.168177\,t^2 + 0.756911\sqrt{S}\,t^2 + 0.0032\,S\,t^2 - 0.00459824\,t^3 - 0.0103476\sqrt{S}\,t^3 - 0.0000853333\,S\,t^3$$

```
Manipulate[
 Plot[{U[S, t]}, {S, 0, 500}, PlotLegends → Placed[{"U_EXACTA", "U_ADM"}, Above],
  PlotStyle → {Triangle, Dashed}, AxesOrigin → {0, 0}], {t, 0.1, 10}]
```

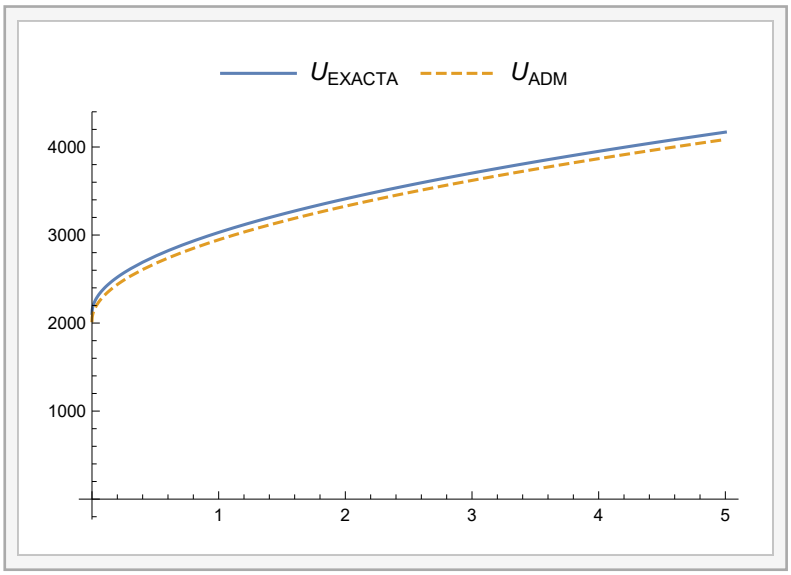




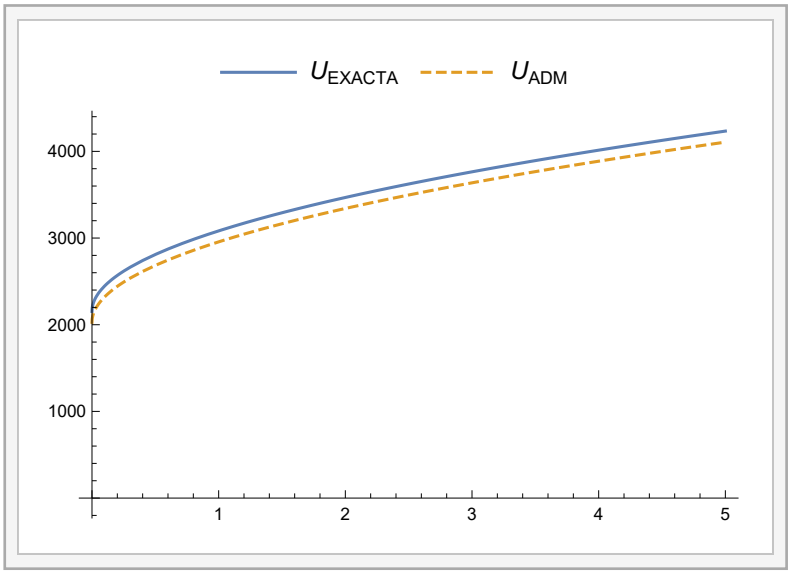
0


U_{EXACTA}
U_{ADM}
4000
3000
2000
1000
1
2
3
4
5

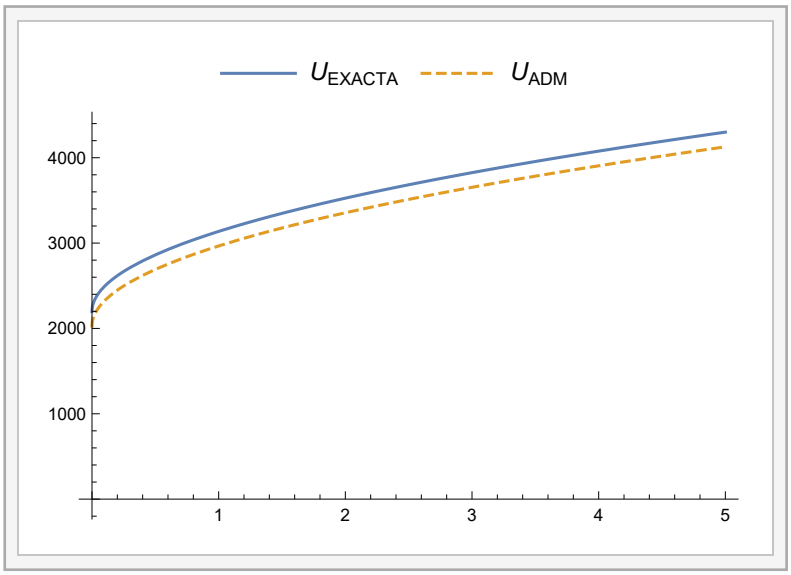
.25


U_{EXACTA}
U_{ADM}
4000
3000
2000
1000
1
2
3
4
5

5



75



1

```
f[x_] := 19.05 + 12.11 * x + 6.09 ^2 + 8.07 * x^3 + .24 * x^4 +
  .21 * x^5 + .084 * x^6 + .85 * x^7 + .75 * x^8 + .24 * x^9 + .57 * x^10
```

```
f'[5]
```

1.25412×10^7

```
f''[5]
```

2.21593×10^7

```
f'''[5]
```

3.48532×10^7

```
f''''[5]
```

4.80331×10^7

```
f''''[5]
```

4.80331×10^{7}

```
Integrate[f[x], {x, 0, 5}]
```

2.97215×10^{6}

In[1]:=
```
f[x_] := 19.05 + 12.11 * x + 6.09 ^2 + 8.07 * x^3 + .24 * x^4
```

In[2]:=
```
f'[5]
```

Out[2]= 737.36

In[3]:=
```
f''[5]
```

Out[3]= 314.1

In[4]:=
```
f'''[5]
```

Out[4]= 77.22

In[5]:=
```
f''''[5]
```

Out[5]= 5.76

In[6]:=
```
Integrate[f[x], {x, 0, 5}]
```

Out[6]= 1843.