

[ Variacni pocet - Eulerova rovnice

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[ > restart;

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[ > **vyraz:=2\*y\*exp(t)+y^2+dy^2;**

[ >

$$vyraz := 2 y e^t + y^2 + dy^2$$

[ > **F\_dy\_dy:=diff(vyraz,dy,dy);**

[ >

$$F_{dy\_dy} := 2$$

[ > **F\_y\_dy:=diff(vyraz,y,dy);**

[ >

$$F_{y\_dy} := 0$$

[ > **F\_t\_dy:=diff(vyraz,t,dy);**

[ >

$$F_{t\_dy} := 0$$

[ > **F\_y:=diff(vyraz,y);**

[ >

$$F_y := 2 e^t + 2 y$$

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[ Eulerova rovnice:

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[ **Euler\_rovnice:=2\*D(D(y))(t)-2\*exp(t)-2\*y(t)=0;**

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$$Euler\_rovnice := 2 (D^{(2)})(y)(t) - 2 e^t - 2 y(t) = 0$$

[ > **poc\_pod := y(0)=2, y(2)=2\*exp(2)+exp(-2);**

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$$poc\_pod := y(0) = 2, y(2) = 2 e^2 + e^{(-2)}$$

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[ > **vysledek:=simplify(dsolve( {Euler\_rovnice, poc\_pod} , {y(t)} ));**

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$$vysledek := y(t) = e^{(-t)} + e^t + \frac{1}{2} t e^t$$

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[ Nyni spoctu hodnotu integralu (funkcionalu) pro vypocitanou funkci:

[ > `evalf(int(2*vyraz*exp(t)+vyraz^2+(diff(vyraz,t))^2,t=0..2));`

[  $107.1963001 y + 227.1707123 y^2 + 12.77811220 dy^2 + 25.55622440 y^3 + 25.55622440 y dy^2$   
[  $+ 2. y^4 + 4. y^2 dy^2 + 2. dy^4$

[ Zkusim nejakou jinou funkci spojici prislusne dva body. Vyberu si primku.

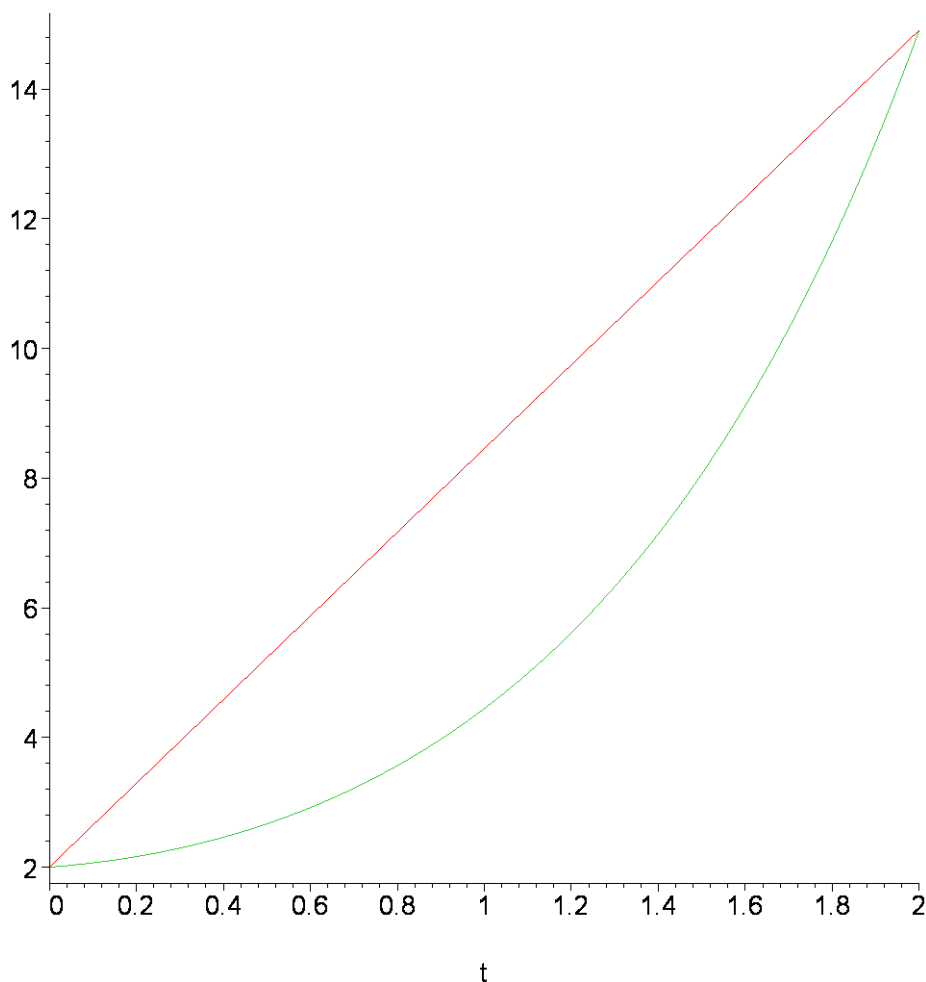
[ Pro hledanou primku  $y=Ax+B$  plati:  $A=(2*\exp(2)+\exp(-2)-2)/2$  a  $B=2$

[ >

[ Znazornim vysledek - moznou (extremalu) graficky spolu s danou primkou:

[ > `vyraz := subs(vysledek, y(t));`

[ > `plot({vyraz(t), ((2*exp(2)+exp(-2)-2)/2)*t+2}, t=0..2);`



[ Spoctu hodnotu funkcionalu pro primku prochazejici prislusnymi body urcenymi poc.podminkami.

[ > `evalf(int(((2*exp(2)+exp(-2)-2)/2)*t+2,t=0..2));`

[  $16.91344748$

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