Unknowns

⊞ Utils

⊞ Unknowns

⊟ Unknowns Examples

Trivial expressions

$Unk(-3+\pi\cdot i)=0$ $Unk(a+-3+\pi\cdot i)=[a]$

Non-Trivial expressions

$$A:=\begin{bmatrix}\dfrac{\cos(+a\cdot x_2)}{7\ \mathrm{Blue}}\cdot\dfrac{\sin(g(-\alpha))}{xo\cdot\alpha\cdot h(\mathbf{u}_4)}+\dfrac{(f(x\ \mathrm{kg}))^{-2}}{-b_1\cdot\ln(\mathrm{atan}(b_2,a))} & \begin{cases}x & \text{if } y\\ z & \text{otherwise}\end{cases}\end{bmatrix}$$

$\mathrm{Unknowns}(A)^T=[\mathbf{u}\ a\ b\ x\ x_2\ xo\ y\ z\ \alpha]$

$Options(\mathrm{Unk}, Units)="0"$ $Unk(A)^T=[a\ b\ x\ x_2\ xo\ y\ z\ \mathbf{u}\ \alpha]$

$Options(\mathrm{Unk}, Units:="1")="1"$ $Unk(A)^T=[\mathrm{Blue}\ a\ b\ x\ x_2\ xo\ y\ z\ \mathbf{u}\ \alpha]$ Undefined units are unknowns.

$Options(\mathrm{Unk}, Units:="0")="0"$ Restore default

Several unknowns

$$B:=\begin{bmatrix}a & \mathbf{a} & b & c & d & \mathbf{e} & f & \begin{cases}aa\\ bb\\ cc\end{cases} & h\# & i & j & g & \begin{cases}xx & \text{if } yy\\ zz & \text{otherwise}\end{cases} & y & u & i & h & p_3 & q_4 & p & \mathbf{e} & r\end{bmatrix}$$

$Unk(B)^T=[a\ aa\ b\ bb\ c\ cc\ d\ f\ g\ h\ h\#\ j\ p\ q\ r\ u\ xx\ y\ yy\ zz\ \mathbf{a}]$

$\mathrm{Unknowns}(B)^T=[\mathbf{a}\ a\ aa\ b\ bb\ c\ cc\ d\ f\ g\ h\ h\#\ j\ p\ q\ r\ u\ xx\ y\ yy\ zz]$

Notice that the variable ~a is sorted in different way

Some examples requires assign Unk to a variable U, and others use it as an intermediate steps. I have not an idea about why.

When num2str fails, it could be neccessary enclose the expression with a Solve Block

Calculus

$Unk\left(\dfrac{d}{d\ u}f(u,|v|)\right)=\begin{bmatrix}u\\ v\end{bmatrix}$ $Unk\left(\int f(u,\mathbf{e}^v)\,d\ u\right)=\begin{bmatrix}u\\ v\end{bmatrix}$ $U:=Unk\left(\int_a^b f\,d\ x\right)=\begin{bmatrix}a\\ b\\ f\\ x\end{bmatrix}$

$E:=\sum(X\cdot Y)$ $U:=Unk(E)^T=[X\ Y]$

$$\begin{bmatrix}\sum_{\kappa=\alpha}^{\beta}x\end{bmatrix}$$
E

$U:=Unk\$("E")^T=[x\ \alpha\ \beta\ \kappa]$

Programming

$$E:=\begin{vmatrix}\text{while } a\\ \quad b\\ x\end{vmatrix}$$

$U:=Unk(E)^T=[x]$

$$\begin{bmatrix}\text{if } x>b\\ \quad x+a\\ \text{else}\\ \quad -x+a\end{bmatrix}$$
E

$U:=Unk\$("E")^T=[a\ b\ x]$

Postfix

$Unk(3+x!+a)=\begin{bmatrix} a \\ x \end{bmatrix}$

Factorial is the only one postfix operator that I know in SMath

Logic

$Unk\left(a<x<\mathbf{e}^{b}\right)^{T}=[\,a\ \ b\ \ x\,]$

$Unk\left(\neg(a\vee b)\wedge(a\vee c)\right)^{T}=[\,a\ \ b\ \ c\,]$

Plugins

$E:=\text{CoolProp\_Props}(\text{"H"},\text{"T"},to,\text{"P"},po,\text{"Water"})$

$U:=Unk(E)^{T}=[\,po\ \ to\,]$

$\begin{bmatrix} \text{rkfixed}(a,0,c,10,f) \end{bmatrix}_{E}$

$U:=Unk\$(\text{"E"})^{T}=[\,a\ \ c\ \ f\,]$

$\begin{bmatrix} a+b\cdot Dirac(x) \end{bmatrix}_{E}$

$U:=Unk\$(\text{"E"})^{T}=[\,a\ \ b\ \ x\,]$

Timing

$E:=x\cdot\cos(a)+y\cdot\sin(b)$

$CSort\$(M):=M$

Enabling this compare with Unk without sorting

$N:=100$

$\begin{bmatrix} to:=\text{time}(0) \\ \text{for } iter\in[1..N] \\ \quad U:=Unk(E) \\ \text{time}(0)-to \end{bmatrix}=7.471\ s$

$\begin{bmatrix} to:=\text{time}(0) \\ \text{for } iter\in[1..N] \\ \quad U:=\text{Unknowns}(E) \\ \text{time}(0)-to \end{bmatrix}=0.008\ s$

Conslusions

Isn't very fast

Another expression to string function convertion is welcomed. Then all issues could be solved.

Alvaro

$\text{appVersion}(4)=\text{"1.0.8348.30405"}$