

# Help with KnotTheory

Hi Dror,

Here I've included several of the inputs that I've tried along with all the path information and folder placement information. Thank you so much for your help.

`In[ ]:= $Path`

```
Out[ ]:= {C:\Users\drorb\AppData\Roaming\Mathematica\DocumentationIndices,
C:\Program Files\Wolfram Research\Mathematica\12.0\SystemFiles\Links,
C:\Users\drorb\AppData\Roaming\Mathematica\Kernel,
C:\Users\drorb\AppData\Roaming\Mathematica\Autoload,
C:\Users\drorb\AppData\Roaming\Mathematica\Applications,
C:\ProgramData\Mathematica\Kernel, C:\ProgramData\Mathematica\Autoload,
C:\ProgramData\Mathematica\Applications, ., C:\Users\drorb,
C:\Program Files\Wolfram Research\Mathematica\12.0\AddOns\Packages,
C:\Program Files\Wolfram Research\Mathematica\12.0\SystemFiles\Autoload,
C:\Program Files\Wolfram Research\Mathematica\12.0\AddOns\Autoload,
C:\Program Files\Wolfram Research\Mathematica\12.0\AddOns\Applications,
C:\Program Files\Wolfram Research\Mathematica\12.0\AddOns\ExtraPackages,
C:\Program Files\Wolfram Research\Mathematica\12.0\SystemFiles\Kernel\Packages,
C:\Program Files\Wolfram Research\Mathematica\12.0\Documentation\English\System,
C:\Program Files\Wolfram Research\Mathematica\12.0\SystemFiles\Data\ICC,
C:\drorbn\AcademicPensieve\Projects\KnotTheory}
```

This is my Path variable, the folder KnotTheory is in /Users/Deaupreme (my home folder). So Mathematica should know where it is.

`In[ ]:= << KnotTheory``

```
Loading KnotTheory` version of February 2, 2020, 10:53:45.2097.
Read more at http://katlas.org/wiki/KnotTheory.
```

As you can see the welcome message does print, and when I type a command from the package Mathematica recognizes it, but there are these red error messages which I don't understand.

`In[ ]:= Alexander[Knot[6, 2]] [t]`

```
KnotTheory: Loading precomputed data in PD4Knots`.
```

```
Out[ ]:= -3 -  $\frac{1}{t^2} + \frac{3}{t} + 3t - t^2$ 
```

Following the Setup Page on Knot atlas I tried this example and the output is correct, but I get these weird error messages too.

`In[ ]:= KnotTheoryVersion []`

```
Out[ ]:= {2020, 2, 2, 10, 53, 45.2097}
```

This is the version I found on the Knot atlas, I assume it's the most up to date one.

In[ ]:= **KnotTheoryDirectory** [ ]

Out[ ]:= C:\drorbn\AcademicPensieve\Projects\KnotTheory\KnotTheory

This looks like it might be a problem, I gather it should spit out a path?

## Now for the bigger stuff ...

In[ ]:= **KnotInput** [ ]

Get: Cannot open LinKnots`.

Needs: Context LinKnots` was not created when Needs was evaluated.

**KnotTheory`KTtoLinKnot`InstallLinKnots**: The function "KnotInput" requires the LinKnot package, which is not distributed as part of KnotTheory. I couldn't seem to load it; try downloading it from <http://www.mi.sanu.ac.yu/vismath/linknot/>, and adding the appropriate directory to the \$Path.

Out[ ]:= **\$Failed**

So here's the graphical input function which returns more error messages.

In[ ]:= **PD**[**DTCode**[-4, -6, -2]]

**KnotTheory**: The GaussCode to PD conversion was written by Siddarth Sankaran at the University of Toronto in the summer of 2005.

Out[ ]:= **PD**[**X**[1, 4, 2, 5], **X**[3, 6, 4, 1], **X**[5, 2, 6, 3]]

In[ ]:= **Alexander**[**PD**[**X**[1, 4, 2, 5], **X**[3, 6, 4, 1], **X**[5, 2, 6, 3]]][**t**]

Out[ ]:=  $-1 + \frac{1}{t} + t$

On the other hand this portion seems to work just fine. The DT code here is for the trefoil. Then we try the Khovanov Homology routines (this is my primary interest in the package).

In[ ]:= **Kh**[**PD**[**X**[1, 4, 2, 5], **X**[3, 6, 4, 1], **X**[5, 2, 6, 3]]][**q**, **t**]

**KnotTheory**: The Khovanov homology program JavaKh-v2 is an update of Jeremy Green's program JavaKh-v1, written by Scott Morrison in 2008 at Microsoft Station Q.

Something went wrong running JavaKh; nothing was returned. The command line was:

```
!java -classpath
"C:\drorbn\AcademicPensieve\Projects\KnotTheory\KnotTheory\JavaKh-v2\bin;C:\drorbn\
AcademicPensieve\Projects\KnotTheory\KnotTheory\JavaKh-v2\jars\commons-cli-1.0.jar;C:\drorbn\
AcademicPensieve\Projects\KnotTheory\KnotTheory\JavaKh-v2\jars\commons-io-1.2.jar;C:\drorbn\
AcademicPensieve\Projects\KnotTheory\KnotTheory\JavaKh-v2\jars\commons-logging-1.1.jar;C:\
drorbn\AcademicPensieve\Projects\KnotTheory\KnotTheory\JavaKh-v2\jars\log4j-1.2.12.jar"
org.katlas.JavaKh.JavaKh --mod 0 < pd 2> JavaKh.log
```

There may have been an error log produced by Java:

```
'java' is not recognized as an internal or external command,
operable program or batch file.
```

Out[ ]:= **\$Failed**[**q**, **t**]

and we get this weird mess of errors.

In[ ]:= **sInvariant**[PD[X[1, 4, 2, 5], X[3, 6, 4, 1], X[5, 2, 6, 3]]]

```

... Get: ParentDirectory[File] in $Path is not a string.
... Get: ParentDirectory[File] in $Path is not a string.
... Get: ParentDirectory[File] in $Path is not a string.
... General: Further output of Get::path will be suppressed during this calculation.
... Get: Cannot open QuantumGroups`Utilities`MatrixWrapper`.
... Needs: Context QuantumGroups`Utilities`MatrixWrapper` was not created when Needs was evaluated.
pd1->PD[X[1, 4, 2, 5], X[3, 6, 4, 7], X[5, 2, 6, 3]]
... ToFileName: String or list of strings expected at position 1 in ToFileName[File, JavaKh-v2].
... ToFileName: String or list of strings expected at position 1 in ToFileName[File, JavaKh-v2].
... ToFileName: String or list of strings expected at position 1 in ToFileName[ToFileName[File, JavaKh-v2], jars].
... General: Further output of ToFileName::strse will be suppressed during this calculation.
... StringJoin: String expected at position 1 in ToFileName[ToFileName[File, JavaKh-v2], bin] <>
: <> ToFileName[ToFileName[ToFileName[File, JavaKh-v2], jars], commons-cli-1.0.jar] <> : <> <<10>>[<<1>>] <>
: <> ToFileName[ToFileName[ToFileName[File, JavaKh-v2], jars], commons-logging-1.1.jar] <>
: <> ToFileName[ToFileName[ToFileName[File, JavaKh-v2], jars], log4j-1.2.12.jar].
... StringJoin: String expected at position 3 in ToFileName[ToFileName[File, JavaKh-v2], bin] <>
: <> ToFileName[ToFileName[ToFileName[File, JavaKh-v2], jars], commons-cli-1.0.jar] <> : <> <<10>>[<<1>>] <>
: <> ToFileName[ToFileName[ToFileName[File, JavaKh-v2], jars], commons-logging-1.1.jar] <>
: <> ToFileName[ToFileName[ToFileName[File, JavaKh-v2], jars], log4j-1.2.12.jar].
... StringJoin: String expected at position 5 in ToFileName[ToFileName[File, JavaKh-v2], bin] <>
: <> ToFileName[ToFileName[ToFileName[File, JavaKh-v2], jars], commons-cli-1.0.jar] <> : <> <<10>>[<<1>>] <>
: <> ToFileName[ToFileName[ToFileName[File, JavaKh-v2], jars], commons-logging-1.1.jar] <>
: <> ToFileName[ToFileName[ToFileName[File, JavaKh-v2], jars], log4j-1.2.12.jar].
... General: Further output of StringJoin::string will be suppressed during this calculation.
... SetDirectory: The specified argument ToFileName[File, JavaKh-v2] should be a valid string or File.
... OpenRead: Cannot open <<1>>.
... Read: $Failed is not a string, SocketObject, InputStream[ ], or OutputStream[ ].
... Close: $Failed is not a string, SocketObject, InputStream[ ], or OutputStream[ ].
... ResetDirectory: Directory stack is empty.
... StringReplace: String or list of strings expected at position 1 in StringReplace[Read[$Failed, Expression], {q -> #1, t -> #2}].
... System`ToExpression:  is not a string or a box. ToExpression can only interpret strings or boxes as Wolfram Language
input.
kh->$Failed[KnotTheory`UniversalKh`Private`q, KnotTheory`UniversalKh`Private`t]

```

Out[ ]:= 0

Same problem for the s-Invariant function. It's strange to me how some of the commands seem to go through fine, but the larger routines don't work. I notice that the phrase

```

... Get: "\\(\*RowBox[{"ParentDirectory\", \"[\", \"File\", \"]\"}]) in $Path is not a string."

```

seems to appear early on in all the lists of errors, but I'm not sure what it's saying or how to fix it.

If there's anything else you'd like to know about my set up I'm happy to let you know. Thank you again for helping me with this.

Charles