

Pensieve header: This is the index file for the Theta project.

```
In[*]:= SetDirectory["C:\\drorbn\\AcademicPensieve\\Projects\\Theta"]
```

```
Out[*]=
```

```
C:\drorbn\AcademicPensieve\Projects\Theta
```

```
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<div style=\"clear: right; float: right; padding: 8px; width:
  400px;\"><a href=Theta.pdf><img width=400px src=figs/Top15.png></a></div>
This is the construction / computation page for my joint paper with <a
  class=external href=\"http://www.rolandvdv.nl/\">Roland van der Veen</a>:
<p><b>A Very Fast, Very Strong, Topologically Meaningful and Fun Knot Invariant.</b>
<p>Paper PDF here: <a href=Theta.pdf>Theta.pdf</a>.
  Computations here: <a href=Theta.nb>Theta.nb</a>.
<p><b>Abstract.</b> ",
  StringReplace[ReadString["abstract.tex"], {
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      "Ohtsuki:TwoLoop" → "<a class=external href=https://msp.org/gt/2007/11-3/p04.xhtml>Oh</a>",
      "GaroufalidisRozansky:LoopExpansion" →
        "<a class=external href=https://arxiv.org/abs/math.GT/0003187>GR</a>",
      "Rozansky:Contribution" →
        "<a class=external href=https://arxiv.org/abs/hep-th/9401061>Ro1</a>",
      "Rozansky:Burau" → "<a class=external href=https://arxiv.org/abs/q-alg/9604005>Ro2</a>",
      "Rozansky:U1RCC" → "<a class=external href=https://arxiv.org/abs/math/0201139>Ro3</a>",
      "Kricker:Lines" → "<a class=external href=https://arxiv.org/abs/math/0005284>Kr</a>"
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    "\\begin{itemize}" → "<ul>", "\\item" → "<li>", "\\end{itemize}" → "</ul>"
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Out[]=

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width: 400px;"><a href=APAI.pdf><img width=400px src=figs/PP302.png></a></div>
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This is the construction / computation page for my joint paper

with <http://www.rolandvdv.nl/>: Roland van der Veen:

A Very Fast, Very Strong, Topologically Meaningful and Fun Knot Invariant.

Paper PDF here: [. Computations here: \[.\]\(Theta.nb>Theta.nb</a\)](Theta.pdf>Theta.pdf</a)

Abstract. In this paper we introduce $\Theta=(\Delta, \theta)$, a pair of polynomial knot invariants which is:

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<ul>
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<li> Theoretically and practically fast:  $\Theta$  can be computed in polynomial time
and we computed it in full on random knots with over 300 crossings,
and its evaluation on on simple rational numbers on random knots with over
700 crossings.
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<li> Strong: Its separation power is much greater than, say, the
HOMFLY-PT polynomial and Khovanov homology (taken together) on knots
with up to 15 crossings (while computing much faster).
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<li> Topologically meaningful: It gives a genus bound, and there are
reasons to hope that it would do more.
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<li> Fun: Scroll to Figures 1.1 and 1.2.
```

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</ul>
```

Δ is merely the Alexander polynomial. θ is almost

certainly equal to an invariant that was studied extensively by Ohtsuki

[<https://msp.org/gt/2007/11-3/p04.xhtml>], continuing Rozansky, Garoufalidis, and Kricker

[<https://arxiv.org/abs/math.GT/0003187>], <https://arxiv.org/abs/hep-th/9401061>,

<https://arxiv.org/abs/q-alg/9604005>,

<https://arxiv.org/abs/math/0201139>, <https://arxiv.org/abs/math/0005284>]. Yet our formulas,

proofs, and programs are much simpler and enable its computation even on very large knots.

}