https://www.colliseum.eu/wiki/Testing_MathJax_and_Xy-pic

Testing MathJax and Xy-pic

Testing Xy-pic extension for MathJax

- 04102020 - Check rendering

\begin{xy} 0;<0.8pc,0pc>: (0,0)="o", "o"*!/rd 1em/{O}, "o"+/l 3pc/="xs";"o"+/r 13pc/="xe" **@{-} ?>*@{>} ?>*!/u 1em/{x}, "o"+/d 3pc/="ys";"o"+/u 8pc/="ye" **@{-} ?>*@{>} ?>*!/r 1em/{y}, (13,10)*{y=f(x)}, (13,-3)*{x_{n+1} = x_n - \frac{f(x_n)}{f'(x_n)}},

(13.5,0)="x0" *!/u 1em/{x_0},

(-3,-4)="A", (15,9)="B", (1.5,5)="C", (10,-2.5)="D", "A";"B" **\crv{"C"&"D"}, ?!{"x0"+/d 3pc/;"x0"+/u 10pc/}="fx0" +/3pc/="L1e" -/12pc/="L1s";"L1e" **\dir{--}, ?!{"xs";"xe"}="x1" *!/u 1em/{x_1}, "fx0";"fx0"+/l 20pc/ **@{} ?!{"ys";"ye"}="y0" *!/r 1em/{f(x_0)}, "fx0";"y0" **@{.}, "x0";"fx0" **@{.}, "L1e" *!/l 5em/{y=f(x_0)+f'(x_0)(x-x_0)},

"A";"B" **\crv{~**@{} "C"&"D"}, ?!{"x1"+/d 3pc/;"x1"+/u 10pc/}="fx1" +/5pc/="L2e" -/15pc/="L2s";"L2e" **\dir{--}, ?!{"xs";"xe"}="x2" *!/u 1em/{x_2}, "fx1";"fx1"+/l 20pc/ **@{} ?!{"ys";"ye"}="y1" *!/r 1em/{f(x_1)}, "fx1";"y1" **@{.}, "x1";"fx1" **@{.}, "L2e" *!/l 5em/{y=f(x_1)+f'(x_1)(x-x_1)}, \end{xy}

- Arrow feature

\begin{xy} \xymatrix {

- \txt{start} \ar[r]

```
& *++[o][F-]{0} \ar@(r,u)[]^b \ar[r]_a
& *++[o][F-]{1} \ar[r]^b \ar@(r,d)[]_a
& *++[o][F-]{2} \ar[r]^b
 \ar `dr_l[l] `_ur[l] _(.2)a[l]
& *++[o][F=]{3}
 \ar `ur^l[lll] `^dr[lll]^b [lll]
 \ar `dr_l[ll] `_ur[ll] [ll]
```

} \end{xy}

- Xymatrix Feature

\begin{xy} \xymatrix{ U \ar@/_/[ddr]_y \ar@{.>}[dr]|{\langle x,y \rangle} \ar@/^/[drr]^x \\

```
& X \times_Z Y \ar[d]^q \ar[r]_p & X \ar[d]_f \\
& Y \ar[r]^g & Z
```

} \end{xy}

\begin{xy} \xymatrix@R=1pc{ \zeta \ar@{|->} [dd] \ar@{.>}_\theta [rd] \ar@/^/^\psi [rrd] \\

```
& \xi \ar@{|->} [dd] \ar_\phi [r] & \eta \ar@{|->} [dd] \\
P_{F}\zeta \ar_t [rd] \ar@/^/ [rrd]|!{[ru];[rd]}\hole \\
& P_{F}\xi \ar [r] & P_{F}\eta
```

} \end{xy}

\begin{xy} \xymatrix @W=3pc @H=1pc @R=0pc @*[F-] {

    \save+<-4pc,1pc>*{\it root}

```
   \ar[]
 \restore \\
```

{\bullet}

```
 \save*{}
   \ar `r[dd]+/r4pc/ `[dd] [dd]
 \restore \\
```

{\bullet}

```
 \save*{}
   \ar `r[d]+/r3pc/ `[d]+/d2pc/ `[uu]+/l3pc/ `[uu] [uu]
 \restore \\
```

1 } \end{xy}

\begin{xy} \xymatrix {

- +!!A{c} \ar[r] \ar[d] &
- +!!A{a\frac{x}{y}} \ar[r] \ar[d] \ar[ld] &
- +!!A{\underline{\underline{g}}} \ar[r] \ar[d] \ar[ld] &
- +!!A{\hat{\hat{\overline{\overline{h^2}}}}} \ar[d] \ar[ld] \\

```
   {c} \ar[r] &
   {a\frac{x}{y}} \ar[r] &
   {\underline{\underline{g}}} \ar[r] &
   {\hat{\hat{\overline{\overline{h^2}}}}} \\
```

} \end{xy}

\begin{xy} \xymatrix{ \mathcal R \ar[r]<2pt>^{r_1} \ar[r]<-2pt>_{r_2} & S \ar[r]^q \ar[dr]_f & S / \mathcal R \ar@{.>}[d]^{\bar f} \\

```
& & T
```

} \end{xy}

- Newton's Method

\begin{xy} 0;<0.8pc,0pc>: (0,0)="o", "o"*!/rd 1em/{O}, "o"+/l 3pc/="xs";"o"+/r 13pc/="xe" **@{-} ?>*@{>} ?>*!/u 1em/{x}, "o"+/d 3pc/="ys";"o"+/u 8pc/="ye" **@{-} ?>*@{>} ?>*!/r 1em/{y}, (13,10)*{y=f(x)}, (13,-3)*{x_{n+1} = x_n - \frac{f(x_n)}{f'(x_n)}},

(13.5,0)="x0" *!/u 1em/{x_0},

(-3,-4)="A", (15,9)="B", (1.5,5)="C", (10,-2.5)="D", "A";"B" **\crv{"C"&"D"}, ?!{"x0"+/d 3pc/;"x0"+/u 10pc/}="fx0" +/3pc/="L1e" -/12pc/="L1s";"L1e" **\dir{--}, ?!{"xs";"xe"}="x1" *!/u 1em/{x_1}, "fx0";"fx0"+/l 20pc/ **@{} ?!{"ys";"ye"}="y0" *!/r 1em/{f(x_0)}, "fx0";"y0" **@{.}, "x0";"fx0" **@{.}, "L1e" *!/l 5em/{y=f(x_0)+f'(x_0)(x-x_0)},

"A";"B" **\crv{~**@{} "C"&"D"}, ?!{"x1"+/d 3pc/;"x1"+/u 10pc/}="fx1" +/5pc/="L2e" -/15pc/="L2s";"L2e" **\dir{--}, ?!{"xs";"xe"}="x2" *!/u 1em/{x_2}, "fx1";"fx1"+/l 20pc/ **@{} ?!{"ys";"ye"}="y1" *!/r 1em/{f(x_1)}, "fx1";"y1" **@{.}, "x1";"fx1" **@{.}, "L2e" *!/l 5em/{y=f(x_1)+f'(x_1)(x-x_1)}, \end{xy}

- Flexible Ruler

\begin{xy} <-0.4cm,0cm>="A";<10cm,0cm>="B", "A";"B" **\crv{<2cm,2cm>&<2cm,-3cm>&<5cm,1cm>&<7cm,0cm>} ?<*@{|} ?</1cm/*@{|} ?</2cm/*@{|} ?</3cm/*@{|} ?</4cm/*@{|} ?</5cm/*@{|} ?</6cm/*@{|} ?</7cm/*@{|} ?</8cm/*@{|} ?</9cm/*@{|} ?</10cm/*@{|} ?</11cm/*@{|} ?</12cm/*@{|} ?</13cm/*@{|} \end{xy}

- Intersection

\begin{xy} 0;<1em,0em>: (0,0)*={+}="+"; (6,3)*={\times}="*" **@{.}, (3,0)*{A}; (6,6)*{B} **@{-} ?!{"+";"*"} *{\oplus} \end{xy}

\begin{xy} (0,0)*{A}="A"; p+/r5pc/+/u3pc/*{B}="B", p+<1pc,3pc>*{C}="C", p+<4pc,-1pc>*{D}="D", "D";"C"**\crv{<3pc,2pc>}, ?!{"A";"B"**@{-}}*{\oplus} \end{xy}

\begin{xy} (0,0)*{A}="A"; p+/r5pc/+/u3pc/*{B}="B", p+<1pc,3pc>*{C}="C", p+<4pc,-1pc>*{D}="D", "A";"B"**\crv{<2pc,3pc>&<3pc,-2pc>}, ?!{"D";"C"**\crv{<3pc,2pc>}}*{\oplus} \end{xy}

\begin{xy} (0,0)*{A}="A"; p+/r5pc/+/u3pc/*{B}="B", p-<.5pc,2pc>*{C}="C", p+<6pc,-.5pc>*{D}="D", "A";"B"**\crv{<6pc,-5pc>}, ?!{"C";"D"**@{-}}*{\otimes} \end{xy}

\begin{xy} (0,0)*{A}="A"; p+/r5pc/+/u3pc/*{B}="B", p-<.5pc,2pc>*{C}="C", p+<6pc,-.5pc>*{D}="D", "A";"B"**\crv{<4pc,-2pc>}, ?!{"C";"D"**@{-}}="E"*{\times}, "E"+/_3pc/;"E"**@{}, ?!{"C";"D"}="F", "E";"F"**@{.} ?>/1em/*!/^1em/{\text{nearest point}} \end{xy}

- Quiver Mutation

\begin{xy} 0*++[c]\xybox{ \xymatrix @=1.5pc @*[F-] @*[o] @*+= { 3 \ar[r]^3 \ar[d]_3 \POS+/lu 1em/*\txt\tiny{1} & 1 \ar[d]^1 \POS+/ru 1em/*\txt\tiny{2} \\ 3 \POS+/ld 1em/*\txt\tiny{1'} & 1 \POS+/rd 1em/*\txt\tiny{2'} }}="lu",

"lu"+/r8em/ *++[c]\xybox{ \xymatrix @=1.5pc @*[F-] @*[o] @*+= { 3 \ar[d]_3 \ar[rd]^3 & 1 \ar[l]_3 \\ 3 & 1 \ar[u]_1 }}="u", "u"+/r8em/ *++[c]\xybox{ \xymatrix @=1.5pc @*[F-] @*[o] @*+= { 3 \ar[r]^3 & 1 \ar[ld]^(0.7){3} \ar[d]^2 \\ 3 \ar[u]^3 & 1 \ar[lu]_(0.7){3} }}="ru",

"ru"+/d8em/ *++[c]\xybox{ \xymatrix @=1.5pc @*[F-] @*[o] @*+= { 3 \ar[d]_6 \ar[rd]_(0.7){3} & 1 \ar[l]_3 \\ 3 \ar[ru]_(0.7)3 & 1 \ar[u]_2 }}="r",

"r"+/d8em/ *++[c]\xybox{ \xymatrix @=1.5pc @*[F-] @*[o] @*+= { 3 \ar[r]^3 & 1 \ar[ld]^(0.7){3} \ar[d]^1 \\ 3 \ar[u]^6 & 1 \ar[lu]_(0.7){3} }}="rd",

"rd"+/l8em/ *++[c]\xybox{ \xymatrix @=1.5pc @*[F-] @*[o] @*+= { 3 \ar[d]_3 & 1 \ar[l]_3 \\ 3 \ar[ru]_3 & 1 \ar[u]_1 }}="d",

"d"+/l8em/ *++[c]\xybox{ \xymatrix @=1.5pc @*[F-] @*[o] @*+= { 3 \ar[r]^3 & 1 \\ 3 \ar[u]^3 & 1 \ar[u]_1 }}="ld",

"lu"+/d8em/ *++[c]\xybox{ \xymatrix @=1.5pc @*[F-] @*[o] @*+= { 3 & 1 \ar[l]_3 \ar[d]^1 \\ 3 \ar[u]^3 & 1 }}="l",

\POS "lu" \ar "u"^2 \POS "u" \ar "ru"^1 \POS "ru" \ar "r"^2 \POS "r" \ar "rd"^1 \POS "rd" \ar "d"_2 \POS "d" \ar "ld"_1 \POS "lu" \ar "l"_1 \POS "l" \ar "ld"_2 \end{xy}

- More tests

$\newcommand{\Re}{\mathrm{Re}\,} \newcommand{\pFq}[5]{{}_{#1}\mathrm{F}_{#2} \left(\genfrac{}{}{0pt}{}{#3}{#4} \bigg| {#5} \right)}$

We consider, for various values of s, the n-dimensional integral \begin{align}

```
 \label{def:Wns}
 W_n (s)
 &:=
 \int_{[0, 1]^n}
   \left| \sum_{k = 1}^n \mathrm{e}^{2 \pi \mathrm{i} \, x_k} \right|^s
\mathrm{d}\boldsymbol{x}
```

\end{align} which occurs in the theory of uniform random walk integrals in the plane, where at each step a unit-step is taken in a random direction. As such, the integral \eqref{def:Wns} expresses the s-th moment of the distance to the origin after n steps.

By experimentation and some sketchy arguments we quickly conjectured and strongly believed that, for k a nonnegative integer \begin{align}

```
 \label{eq:W3k}
 W_3(k) &= \Re \, \pFq32{\frac12, -\frac k2, -\frac k2}{1, 1}{4}.
```

\end{align} Appropriately defined, \eqref{eq:W3k} also holds for negative odd integers. The reason for \eqref{eq:W3k} was long a mystery, but it will be explained at the end of the paper.