A sample of $\LaTeX$

The standard procedure for obtaining a global metric from an infinitesimal form is to first define the length of a path. If $\alpha(t)$ is a smooth path lying in the unit disk Δ parameterized by $t_0 \leq t \leq t_1$, the length of α is defined by

$$\ell(\alpha) = \int_{t_0}^{t_1} \rho_\Delta(\alpha(t))|\alpha'(t)|\,\mathrm{d}t.$$

The length of a piecewise smooth path is the sum of the lengths of each of its smooth parts. Then the distance function is defined by

$$d(a,b) = \inf\{\ell(\alpha)\colon \alpha \text{ is a piecewise smooth path joining } a \text{ to } b\}. \tag{1}$$

This function is obviously symmetric and satisfies the triangle inequality. For the unit disk, let α be a path which joins $a = 0$ to $b = x$, $0 < x < 1$. We can estimate the length of α in the following way: For $\alpha(t) = \alpha_1(t) + i\alpha_2(t)$,

$$\ell(\alpha) = \int_{t_0}^{t_1} \frac{|\alpha'(t)|\,\mathrm{d}t}{1-|\alpha(t)|^2} \geq \int_{t_0}^{t_1} \frac{\alpha_1'(t)}{1-\alpha_1(t)^2}\,\mathrm{d}t = \int_0^x \frac{\mathrm{d}\alpha_1}{1-\alpha_1^2} = \frac{1}{2}\log\frac{1+x}{1-x}. \tag{2}$$

On letting $\alpha(t) = tx$, $0 \leq t \leq 1$, we get equality in (2) and we see that the infimum in (1) is achieved by this curve and that

$$d(0,x) = \frac{1}{2}\log\frac{1+x}{1-x}.$$

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\documentclass[a4paper]{article}
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Every LaTeX file must start with a \documentclass command.

```
\title{A sample of \LaTeX}
\date{}

\addtolength{\hoffset}{-0.7cm}
\addtolength{\textwidth}{1.4cm}
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Everything before \begin{document} is the preamble – document settings etc.

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\begin{document}
\maketitle
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Everything between \begin{document} and \end{document} is what produces output in your PDF file.

```
The standard procedure for obtaining a global metric from an
infinitesimal form is to first define the length of a path. If
$\alpha(t)$ is a smooth path lying in the unit disk $\Delta$
parameterized by $t_0\le t\le t_1$, the length of $\alpha$ is
defined by
\[\ell(\alpha)=\int_{t_0}^{t_1}\rho_\Delta(\alpha(t))|\alpha'(t)|\,\mathrm{d}t.\]

The length of a piecewise smooth path is the sum of the lengths of
each of its smooth parts. Then the distance function is defined by
\begin{equation}
\label{eqn1}
d(a,b)=\inf\{\ell(\alpha)\colon\alpha
\mbox{ is a piecewise smooth path joining $a$ to $b$}\}.
\end{equation}
This function is obviously symmetric and satisfies the triangle
inequality. For the unit disk, let $\alpha$ be a path which joins
$a=0$ to $b=x$, $0<x<1$. We can estimate the length of $\alpha$ in
the following way: For $\alpha(t)=\alpha_1(t)+i\alpha_2(t)$,
\begin{equation}
\label{eqn2}
\ell(\alpha) =
\int_{t_0}^{t_1}\frac{|\alpha'(t)|\,\mathrm{d}t}{1-|\alpha(t)|^2}
\ge
\int_{t_0}^{t_1}\frac{\alpha_1'(t)}{1-\alpha_1(t)^2}\,\mathrm{d}t
=
\int_0^x\frac{\mathrm{d}\alpha_1}{1-\alpha_1^2}
=
\frac{1}{2}\log\frac{1+x}{1-x}.
\end{equation}
```

Note the way that \$ or \[are used to enter maths mode.

\$ or \] are used to leave maths mode.

There is one block of maths mode for each bit of mathematics in the document.

```
On letting $\alpha(t)=tx$, $0\le t\le 1$, we get equality
in~(\ref{eqn2}) and we see that the infimum in~(\ref{eqn1}) is
achieved by this curve and that
\[ d(0,x)=\frac{1}{2}\log\frac{1+x}{1-x}.\]


\end{document}
```