`\newkeytheorem` and `\newkeytheoremstyle` test

Original document by Michael Downes; updated by Barbara Beeton
Adjusted for keytheorems by Matthew Bertucci

November 5, 2024

1 Test of standard theorem styles

Ahlfors' Lemma gives the principal criterion for obtaining lower bounds on the Kobayashi metric.

Ahlfors' Lemma. *Let $ds^2 = h(z)|dz|^2$ be a Hermitian pseudo-metric on $\mathbf{D}_r$, $h \in C^2(\mathbf{D}_r)$, with ω the associated $(1,1)$-form. If $\operatorname{Ric}\omega \geq \omega$ on $\mathbf{D}_r$, then $\omega \leq \omega_r$ on all of $\mathbf{D}_r$ (or equivalently, $ds^2 \leq ds_r^2$).*

Lemma 1.1 (negatively curved families)**.** *Let $\{ds_1^2, \dots, ds_k^2\}$ be a negatively curved family of metrics on $\mathbf{D}_r$, with associated forms ω^1, ..., ω^k. Then $\omega^i \leq \omega_r$ for all i.*

Then our main theorem:

Theorem 1.2. *Let $d_{\max}$ and $d_{\min}$ be the maximum, resp. minimum distance between any two adjacent vertices of a quadrilateral Q. Let σ be the diagonal pigspan of a pig P with four legs. Then P is capable of standing on the corners of Q iff*

$$\sigma \geq \sqrt{d_{\max}^2 + d_{\min}^2}. \tag{1}$$

Corollary 1.3. *Admitting reflection and rotation, a three-legged pig P is capable of standing on the corners of a triangle T iff (1) holds.*

Remark. As two-legged pigs generally fall over, the case of a polygon of order 2 is uninteresting.

2 Custom theorem styles

Exercise 1: Generalize Theorem 1.2 to three and four dimensions.

Note 1*:* This is a test of the custom theorem style 'note'. It is supposed to have variant fonts and other differences.

B-Theorem 1.
Test of the 'linebreak' style of theorem heading.

This is a test of a citing theorem to cite a theorem from some other source.

Theorem 3.6 in [1]. *No hyperlinking available here yet ... but that's not a bad idea for the future.*

3 The proof environment

Proof. Here is a test of the proof environment. □

Proof of Theorem 1.2. And another test. □

Proof (necessity). And another. □

Proof (sufficiency). And another, ending with a display:

$$1 + 1 = 2\,. \qquad \square$$

4 Test of number-swapping

This is a repeat of the first section but with numbers in theorem heads swapped to the left.

Ahlfors' Lemma gives the principal criterion for obtaining lower bounds on the Kobayashi metric.

Ahlfors' Lemma. *Let* $ds^2 = h(z)|dz|^2$ *be a Hermitian pseudo-metric on* $\mathbf{D}_r$*,* $h \in C^2(\mathbf{D}_r)$*, with* ω *the associated* $(1,1)$*-form. If* $\operatorname{Ric}\omega \geq \omega$ *on* $\mathbf{D}_r$*, then* $\omega \leq \omega_r$ *on all of* $\mathbf{D}_r$ *(or equivalently,* $ds^2 \leq ds_r^2$*).*

4.1 Lemma (negatively curved families)**.** *Let* $\{ds_1^2, \dots, ds_k^2\}$ *be a negatively curved family of metrics on* $\mathbf{D}_r$*, with associated forms* ω^1*, ...,* ω^k*. Then* $\omega^i \leq \omega_r$ *for all* i*.*

Then our main theorem:

4.2 Theorem. *Let* $d_{\max}$ *and* $d_{\min}$ *be the maximum, resp. minimum distance between any two adjacent vertices of a quadrilateral* Q*. Let* σ *be the diagonal pigspan of a pig* P *with four legs. Then* P *is capable of standing on the corners of* Q *iff*

$$\sigma \geq \sqrt{d_{\max}^2 + d_{\min}^2}. \tag{2}$$

4.3 Corollary. *Admitting reflection and rotation, a three-legged pig* P *is capable of standing on the corners of a triangle* T *iff (2) holds.*

References

[1] Dummy entry.