

fong-spivak-invitation: residuals

equations measured 2026-09-05T11:48:20Z against the model of 2026-09-03

Unresolved

Identifier	Page	Conf.	LaTeX source	Rendered	Image
fong-spivak-invitation_ E00202 [conf 0.001]	291	■ 0.001 ● C +70	G_{1}=\begin{array}{ c } \hline \text{ { 李 } } \\ \hline f=g \\ \end{array} \quad G_{2}=\begin{array}{ c } \hline f \\ \stackrel{\mathcal{Q}}{\downarrow} \\ a \\ \hline f=a \\ \end{array} \quad G_{3}=\begin{array}{ ccc } \bullet & \xrightarrow{f} & \bullet \\ g\downarrow & & \downarrow h \\ \bullet & \xrightarrow{i} & \bullet \\ f\circ h=g\circ i \\ \hline \end{array} \quad G_{4}=\begin{array}{ ccc } \bullet & \xrightarrow{f} & \bullet \\ g\downarrow & & \downarrow h \\ \bullet & & \bullet \\ \hline \text{no equations} \\ \hline \end{array}	(not rendered)	
fong-spivak-invitation_ F02349	228	■ 0.185	\operatorname{cospan} \underline{a} \xrightarrow{\operatorname{id}_{\underline{a}}} \underline{a} \stackrel{\operatorname{id}_{\underline{a}}}{\longleftarrow} \underline{a} \text{ { 古 } }	(not rendered)	(iv) identities $\operatorname{id}_a \in \mathbf{Set}(a; a)$ just given by the identity $\operatorname{cospan} \underline{a} \xrightarrow{\operatorname{id}_{\underline{a}}} \underline{a} \xleftarrow{\operatorname{id}_{\underline{a}}} \underline{a}$.
Conf. MathPix confidence: ■ ≥0.9 ■ 0.5–0.9 ■ <0.5 — no value LaTeX source MathPix’s reading, unchanged; Rendered the same reading, with a display environment (align/alignat/flalign/eqnarray/gather/multline/split) mapped to its in-math form so it can typeset in this cell — the two may legitimately differ Residual render vs scan (inkdrill): ● C component ● W weak ● S stable ● N noise ● K clean ● not measured [refined: basis] beside an identifier: the LaTeX-source and Rendered cells both show a VERIFIED refinement, not MathPix’s own reading — basis names what verified it (e.g. ink, source). The original reading is unchanged in the model but is not the one drawn here.					

Flagged, not acted on

Identifier	Page	Conf.	LaTeX source	Rendered	Image
fong-spivak-invitation_EQ0095	146	■ 0.151 ● C +37	$\operatorname{Col}(\Phi)(a,b) := \begin{cases} \mathcal{X}(a,b) & \text{if } a,b \in \mathcal{X} \\ \Phi(a,b) & \text{if } a \in \mathcal{X}, b \in \mathcal{Y} \\ \emptyset & \text{if } a \in \mathcal{Y}, b \in \mathcal{X} \\ y(a,b) & \text{if } a,b \in \mathcal{Y} \end{cases}$	$\operatorname{Col}(\Phi)(a,b) := \begin{cases} \mathcal{X}(a,b) & \text{if } a,b \in \mathcal{X} \\ \Phi(a,b) & \text{if } a \in \mathcal{X}, b \in \mathcal{Y} \\ \emptyset & \text{if } a \in \mathcal{Y}, b \in \mathcal{X} \\ y(a,b) & \text{if } a,b \in \mathcal{Y} \end{cases}$	$\operatorname{Col}(\Phi)(a,b) := \begin{cases} \mathcal{X}(a,b) & \text{if } a,b \in \mathcal{X}, \\ \Phi(a,b) & \text{if } a \in \mathcal{X}, b \in \mathcal{Y}, \\ \emptyset & \text{if } a \in \mathcal{Y}, b \in \mathcal{X}, \\ y(a,b) & \text{if } a,b \in \mathcal{Y}. \end{cases}$
fong-spivak-invitation_EQ0134	213	■ 0.235 ● C +91	$\begin{array}{l} \operatorname{in}(\mu) := 2, \\ \& \operatorname{in}(\eta) := 0, \operatorname{in}(\delta) := 1, \\ \& \operatorname{in}(\epsilon) := 1, \\ \operatorname{out}(\mu) := 1, \operatorname{out}(\eta) := 1, \operatorname{out}(\delta) := 2, \operatorname{out}(\epsilon) := 0. \end{array}$	$\operatorname{in}(\mu) := 2, \operatorname{in}(\eta) := 0, \operatorname{in}(\delta) := 1, \operatorname{in}(\epsilon) := 1,,$	$\begin{array}{llll} \operatorname{in}(\mu) := 2, & \operatorname{in}(\eta) := 0, & \operatorname{in}(\delta) := 1, & \operatorname{in}(\epsilon) := 1, \\ \operatorname{out}(\mu) := 1, & \operatorname{out}(\eta) := 1, & \operatorname{out}(\delta) := 2, & \operatorname{out}(\epsilon) := 0. \end{array}$
fong-spivak-invitation_EQ0227	306	■ 0.259 ● C +43	$\begin{aligned} & \bigvee_{a,b,c,d,e \in \mathcal{X}} \alpha^{-1}(x,(a,1)) \otimes \mathrm{U}_{\mathcal{X}}(a,b) \otimes \eta_{\mathcal{X}}(1,c,d) \\ & \otimes (\epsilon_{\mathcal{X}} \times \mathrm{U}_{\mathcal{X}})((b,c,d),(1,e)) \otimes \alpha((1,e),y) \\ & = \bigvee_{a,b,c,d,e \in \mathcal{X}} \alpha^{-1}(x,(a,1)) \otimes \mathrm{U}_{\mathcal{X}}(a,b) \otimes \eta_{\mathcal{X}}(1,c,d) \\ & \otimes \epsilon_{\mathcal{X}}(b,c,1) \otimes \mathrm{U}_{\mathcal{X}}(d,e) \otimes \alpha((1,e),y) \\ & = \bigvee_{a,b,c,d,e \in \mathcal{X}} \mathcal{X}(x,a) \otimes \mathcal{X}(a,b) \otimes \mathcal{X}(c,d) \otimes \mathcal{X}(b,c) \otimes \mathcal{X}(d,e) \otimes \mathcal{X}(e,y) \\ & = \mathcal{X}(x,y), \end{aligned}$	$\begin{aligned} & \bigvee_{a,b,c,d,e \in \mathcal{X}} \alpha^{-1}(x,(a,1)) \otimes (\mathrm{U}_{\mathcal{X}} \times \eta_{\mathcal{X}})((a,1),(b,c,d)) \\ & = \bigvee_{a,b,c,d,e \in \mathcal{X}} \alpha^{-1}(x,(a,1)) \otimes \mathrm{U}_{\mathcal{X}}(a,b) \otimes \eta_{\mathcal{X}}(1,c,d)((b,c,d),(1,e)) \otimes \alpha((1,e),y) \\ & = \bigvee_{a,b,c,d,e \in \mathcal{X}} x(x,a) \otimes \epsilon_{\mathcal{X}}(b,c,1) \otimes \mathrm{U}_{\mathcal{X}}(d,e) \otimes \alpha((1,e),y) \\ & = x(x,y), \end{aligned}$	$\begin{aligned} & \bigvee_{a,b,c,d,e \in \mathcal{X}} \alpha^{-1}(x,(a,1)) \otimes (\mathrm{U}_{\mathcal{X}} \times \eta_{\mathcal{X}})((a,1),(b,c,d)) \\ & \otimes (\epsilon_{\mathcal{X}} \times \mathrm{U}_{\mathcal{X}})((b,c,d),(1,e)) \otimes \alpha((1,e),y) \\ & = \bigvee_{a,b,c,d,e \in \mathcal{X}} \alpha^{-1}(x,(a,1)) \otimes \mathrm{U}_{\mathcal{X}}(a,b) \otimes \eta_{\mathcal{X}}(1,c,d) \\ & \otimes \epsilon_{\mathcal{X}}(b,c,1) \otimes \mathrm{U}_{\mathcal{X}}(d,e) \otimes \alpha((1,e),y) \\ & = \bigvee_{a,b,c,d,e \in \mathcal{X}} \mathcal{X}(x,a) \otimes \mathcal{X}(a,b) \otimes \mathcal{X}(c,d) \otimes \mathcal{X}(b,c) \otimes \mathcal{X}(d,e) \otimes \mathcal{X}(e,y) \\ & = \mathcal{X}(x,y), \end{aligned}$
fong-spivak-invitation_EQ0075 (3.15)	121	■ 0.380 ● C +40	$\mathcal{G} := \mid \stackrel{\text{Email}}{\text{received_by}} \underset{\text{sent_by}}{\longrightarrow} \text{Address}$	<i>(not rendered)</i>	$\mathcal{G} := \begin{array}{c} \text{Email} \xrightarrow{\text{sent_by}} \text{Address} \\ \text{received_by} \\ \text{no equations} \end{array}$
fong-spivak-invitation_EQ0010 (1.7)	44	■ 0.623 ● C +21	$p \leq g(f(p)) \quad \text{and} \quad f(g(q)) \leq q.$	$p \leq g(f(p)) \quad \text{and} \quad f(g(q)) \leq q.$	$p \leq g(f(p)) \quad \text{and} \quad f(g(q)) \leq q.$
fong-spivak-invitation_EQ0143 (6.21)	226	■ 0.754 ● C +20	$\begin{aligned} & \circ_i : \mathcal{O}(s_1, \dots, s_m; t_i) \times \mathcal{O}(t_1, \dots, t_n; t) \\ & \rightarrow \mathcal{O}(t_1, \dots, t_{i-1}, s_1, \dots, s_m, t_{i+1}, \dots, t_n; t); \end{aligned}$	$\circ_i : \mathcal{O}(s_1, \dots, s_m; t_i) \times \mathcal{O}(t_1, \dots, t_n; t) \\ \rightarrow \mathcal{O}(t_1, \dots, t_{i-1}, s_1, \dots, s_m, t_{i+1}, \dots, t_n; t);$	$\circ_i : \mathcal{O}(s_1, \dots, s_m; t_i) \times \mathcal{O}(t_1, \dots, t_n; t) \\ \rightarrow \mathcal{O}(t_1, \dots, t_{i-1}, s_1, \dots, s_m, t_{i+1}, \dots, t_n; t);$
fong-spivak-invitation_EQ0131	206	■ 0.985 ● C +28	$\operatorname{colim}_{\mathcal{J}} D := \{(v,d) \mid v \in V \text{ and } d \in D(v)\} / \sim$	$\operatorname{colim}_{\mathcal{J}} D := \{(v,d) \mid v \in V \text{ and } d \in D(v)\} / \sim$	$\operatorname{colim}_{\mathcal{J}} D := \{(v,d) \mid v \in V \text{ and } d \in D(v)\} / \sim$

Conf. MathPix confidence: ■ ≥ 0.9 ■ 0.5-0.9 ■ < 0.5 — no value
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Residual render vs scan (inkdrill): ● C component ● W weak ● S stable ● N noise ● K clean ● not measured
[refined: *basis*] beside an identifier: the LaTeX-source and Rendered cells both show a VERIFIED refinement, not MathPix’s own reading — *basis* names what verified it (e.g. ink, source). The original reading is unchanged in the model but is not the one drawn here.

69 more flagged rows below the band, stated as a count: 40 component, 29 weak; confidence high 37, mid 12, low 20, none 0

Low confidence

Identifier	Page	Conf.	LaTeX source	Rendered	Image
fong-spivak-invitation-EQ0135 [conf 0.019]	215	■ 0.019	\begin{aligned} \mu_X &:= \left(X + X \xrightarrow{\mathrm{id}_X} \mathrm{id}_X X \stackrel{\mathrm{id}_X}{\longleftarrow} X\right) \\ \eta_X &:= \left(\emptyset \xrightarrow{!_X} X \stackrel{\mathrm{id}_X}{\longleftarrow} X\right) \\ \delta_X &:= \left(X \xrightarrow{\mathrm{id}_X} X \stackrel{\mathrm{id}_X}{\longleftarrow} X + X\right) \\ \epsilon_X &:= \left(X \xrightarrow{\mathrm{id}_X} \emptyset\right) \end{aligned}	$\mu_X := \left(X + X \xrightarrow{[\mathrm{id}_X, \mathrm{id}_X]} X \xleftarrow{\mathrm{id}_X} X\right)$ $\eta_X := \left(\emptyset \xrightarrow{!_X} X \xleftarrow{\mathrm{id}_X} X\right)$ $\delta_X := \left(X \xrightarrow{\mathrm{id}_X} X \xrightarrow[\mathrm{id}_X, \mathrm{id}_X]{} X + X\right)$ $\epsilon_X := \left(X \xrightarrow{\mathrm{id}_X} \emptyset\right)$	$\begin{aligned} \mu_X &:= (X + X \xrightarrow{[\mathrm{id}_X, \mathrm{id}_X]} X \xleftarrow{\mathrm{id}_X} X) \\ \eta_X &:= (\emptyset \xrightarrow{!_X} X \xleftarrow{\mathrm{id}_X} X) \\ \delta_X &:= (X \xrightarrow{\mathrm{id}_X} X \xleftarrow{[\mathrm{id}_X, \mathrm{id}_X]} X + X) \\ \epsilon_X &:= (X \xrightarrow{\mathrm{id}_X} X \xleftarrow{!_X} \emptyset) \end{aligned}$
fong-spivak-invitation-EQ0199 [conf 0.051]	291	■ 0.051 S +0	A, \quad A \text{ : } f, \quad A \text{ : } g, \quad A \text{ : } f \text{ : } h, \quad A \text{ : } g \text{ : } i, \quad B, \quad B \text{ : } h, \quad C, \quad C \text{ : } i, \quad D	$A, \quad A : f, \quad A : g, \quad A : f : h, \quad A : g : i, \quad B, \quad B : h, \quad C, \quad C : i, \quad D$	$A, \quad A \circ f, \quad A \circ g, \quad A \circ f \circ h, \quad A \circ g \circ i, \quad B, \quad B \circ h, \quad C, \quad C \circ i, \quad D$
fong-spivak-invitation-EQ0257 (A.2) [conf 0.064]	323	■ 0.064 S -1	\multimap \because N \xrightarrow{\mathrm{id}} X \stackrel{[\mathrm{id}, \mathrm{id}]}{\longleftarrow} X + X \xrightarrow{[\mathrm{id}, \mathrm{id}]} X \xleftarrow{\mathrm{id}} X	$\multimap \because N \xrightarrow{\mathrm{id}} X \xleftarrow{[\mathrm{id}, \mathrm{id}]} X + X \xrightarrow{[\mathrm{id}, \mathrm{id}]} X \xleftarrow{\mathrm{id}} X$	$\multimap \because N \xrightarrow{\mathrm{id}} X \xleftarrow{[\mathrm{id}, \mathrm{id}]} X + X \xrightarrow{[\mathrm{id}, \mathrm{id}]} X \xleftarrow{\mathrm{id}} X$
Conf. MathPix confidence: ■ ≥0.9 ■ 0.5–0.9 ■ <0.5 — no value LaTeX source MathPix’s reading, unchanged; Rendered the same reading, with a display environment (align/alignat/flalign/eqnarray/gather/multline/split) mapped to its in-math form so it can typeset in this cell — the two may legitimately differ Residual render vs scan (inkdrill): ● C component ● W weak ● S stable ● N noise ● K clean ● not measured [refined: basis] beside an identifier: the LaTeX-source and Rendered cells both show a VERIFIED refinement, not MathPix’s own reading — <i>basis</i> names what verified it (e.g. ink, source). The original reading is unchanged in the model but is not the one drawn here.					