differential propositional calculus : appendix 3

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Contents

0.1 Taylor Series Expansion

Taylor Series Expansion $\mathrm{D}\,f = \mathrm{d}\,f + \mathrm{d}^2\,f$

	$\mathrm{d}\,f = \partial_x f \cdot \mathrm{d}\,x + \partial_y f \cdot \mathrm{d}\,y$	$\mathrm{d}^2\,f = \partial_{xy} f \cdot \mathrm{d}\,x\;\mathrm{d}\,y$	$\mathrm{d}\,f\vert_{x\;y}$	$\mathrm{d}\,f\vert_{x\;(y)}$	$\mathrm{d}\,f\vert_{(x)\;y}$	$\mathrm{d}\,f\vert_{(x)(y)}$
f_0	0	0	0	0	0	0
f_1	$(y)\;\mathrm{d}\,x + (x)\;\mathrm{d}\,y$	$\mathrm{d}\,x\;\mathrm{d}\,y$	0	$\mathrm{d}\,x$	$\mathrm{d}\,y$	$\mathrm{d}\,x + \mathrm{d}\,y$
f_2	$y\;\mathrm{d}\,x + (x)\;\mathrm{d}\,y$	$\mathrm{d}\,x\;\mathrm{d}\,y$	$\mathrm{d}\,x$	0	$\mathrm{d}\,x + \mathrm{d}\,y$	$\mathrm{d}\,y$
f_4	$(y)\;\mathrm{d}\,x + x\;\mathrm{d}\,y$	$\mathrm{d}\,x\;\mathrm{d}\,y$	$\mathrm{d}\,y$	$\mathrm{d}\,x + \mathrm{d}\,y$	0	$\mathrm{d}\,x$
f_8	$y\;\mathrm{d}\,x + x\;\mathrm{d}\,y$	$\mathrm{d}\,x\;\mathrm{d}\,y$	$\mathrm{d}\,x + \mathrm{d}\,y$	$\mathrm{d}\,y$	$\mathrm{d}\,x$	0
f_3	$\mathrm{d}\,x$	0	$\mathrm{d}\,x$	$\mathrm{d}\,x$	$\mathrm{d}\,x$	$\mathrm{d}\,x$
f_{12}	$\mathrm{d}\,x$	0	$\mathrm{d}\,x$	$\mathrm{d}\,x$	$\mathrm{d}\,x$	$\mathrm{d}\,x$
f_6	$\mathrm{d}\,x + \mathrm{d}\,y$	0	$\mathrm{d}\,x + \mathrm{d}\,y$	$\mathrm{d}\,x + \mathrm{d}\,y$	$\mathrm{d}\,x + \mathrm{d}\,y$	$\mathrm{d}\,x + \mathrm{d}\,y$
f_9	$\mathrm{d}\,x + \mathrm{d}\,y$	0	$\mathrm{d}\,x + \mathrm{d}\,y$	$\mathrm{d}\,x + \mathrm{d}\,y$	$\mathrm{d}\,x + \mathrm{d}\,y$	$\mathrm{d}\,x + \mathrm{d}\,y$
f_5	$\mathrm{d}\,y$	0	$\mathrm{d}\,y$	$\mathrm{d}\,y$	$\mathrm{d}\,y$	$\mathrm{d}\,y$
f_{10}	$\mathrm{d}\,y$	0	$\mathrm{d}\,y$	$\mathrm{d}\,y$	$\mathrm{d}\,y$	$\mathrm{d}\,y$
f_7	$y\;\mathrm{d}\,x + x\;\mathrm{d}\,y$	$\mathrm{d}\,x\;\mathrm{d}\,y$	$\mathrm{d}\,x + \mathrm{d}\,y$	$\mathrm{d}\,y$	$\mathrm{d}\,x$	0
f_{11}	$(y)\;\mathrm{d}\,x + x\;\mathrm{d}\,y$	$\mathrm{d}\,x\;\mathrm{d}\,y$	$\mathrm{d}\,y$	$\mathrm{d}\,x + \mathrm{d}\,y$	0	$\mathrm{d}\,x$
f_{13}	$y\;\mathrm{d}\,x + (x)\;\mathrm{d}\,y$	$\mathrm{d}\,x\;\mathrm{d}\,y$	$\mathrm{d}\,x$	0	$\mathrm{d}\,x + \mathrm{d}\,y$	$\mathrm{d}\,y$
f_{14}	$(y)\;\mathrm{d}\,x + (x)\;\mathrm{d}\,y$	$\mathrm{d}\,x\;\mathrm{d}\,y$	0	$\mathrm{d}\,x$	$\mathrm{d}\,y$	$\mathrm{d}\,x + \mathrm{d}\,y$
f_{15}	0	0	0	0	0	0

0.2 Partial Differentials and Relative Differentials

Partial Differentials and Relative Differentials

	f	$\frac{\partial f}{\partial x}$	$\frac{\partial f}{\partial y}$	$\mathrm{d}\, f =$ $\partial_x f \cdot \mathrm{d}\, x \ + \ \partial_y f \cdot \mathrm{d}\, y$	$\frac{\partial x}{\partial y}\big\rvert f$	$\frac{\partial y}{\partial x}\big\rvert f$
f_0	$(\ )$	0	0	0	0	0
f_1	$(x)(y)$	(y)	(x)	$(y)\ \mathrm{d}\, x\ +\ (x)\ \mathrm{d}\, y$		
f_2	$(x)\ y$	y	(x)	$y\ \mathrm{d}\, x\ +\ (x)\ \mathrm{d}\, y$		
f_4	$x\ (y)$	(y)	x	$(y)\ \mathrm{d}\, x\ +\ x\ \mathrm{d}\, y$		
f_8	$x\ \ y$	y	x	$y\ \mathrm{d}\, x\ +\ x\ \mathrm{d}\, y$		
f_3	(x)	1	0	$\mathrm{d}\, x$		
f_{12}	x	1	0	$\mathrm{d}\, x$		
f_6	$(x,\ y)$	1	1	$\mathrm{d}\, x + \mathrm{d}\, y$		
f_9	$((x,\ y))$	1	1	$\mathrm{d}\, x + \mathrm{d}\, y$		
f_5	(y)	0	1	$\mathrm{d}\, y$		
f_{10}	y	0	1	$\mathrm{d}\, y$		
f_7	$(x\ \ y)$	y	x	$y\ \mathrm{d}\, x\ +\ x\ \mathrm{d}\, y$		
f_{11}	$(x\ (y))$	(y)	x	$(y)\ \mathrm{d}\, x\ +\ x\ \mathrm{d}\, y$		
f_{13}	$((x)\ y)$	y	(x)	$y\ \mathrm{d}\, x\ +\ (x)\ \mathrm{d}\, y$		
f_{14}	$((x)(y))$	(y)	(x)	$(y)\ \mathrm{d}\, x\ +\ (x)\ \mathrm{d}\, y$		
f_{15}	$((\ ))$	0	0	0	0	0