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Christopher M. Baker^{1,2,3}, How

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460 *Biometrics*, 000 0000

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466 *Biometrics*, 000 0000

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470 *Biometrics*, 000 0000

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568 *Biometrics*, 000 0000

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572 *Biometrics*, 000 0000

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1016 *Biometrics*, 000 0000

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2. Model

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GLM for partially pooled categorical pre

con-

1746*Biometrics*, 000 0000

text,

GLM for partially pooled categorical pre

SO

1748*Biometrics*, 000 0000

they

GLM for partially pooled categorical pre

may

1750 *Biometrics*, 000 0000

be

GLM for partially pooled categorical pre

non-

1752 *Biometrics*, 000 0000

compliant

GLM for partially pooled categorical pre

for

1754 *Biometrics*, 000 0000

re-

GLM for partially pooled categorical pre

lated

1756*Biometrics*, 000 0000

rea-

GLM for partially pooled categorical pre

sons.

1758*Biometrics*, 000 0000

The

GLM for partially pooled categorical pre

in-

1760 *Biometrics*, 000 0000

dices

GLM for partially pooled categorical pre

can

1762 *Biometrics*, 000 0000

take

GLM for partially pooled categorical pre

val-

ues

$$i = 1, \dots, a, \quad a \in \mathbb{N}, \quad a = \# \text{ i}$$

(2)

$$j = 1, 2, \quad \text{without}$$

(3)

The

val-

1766 *Biometrics*, 000 0000

ues

GLM for partially pooled categorical pre

of

1768*Biometrics*, 000 0000

the

GLM for partially pooled categorical pre

in-

1770 *Biometrics*, 000 0000

di-

GLM for partially pooled categorical pre

ca-

1772 *Biometrics*, 000 0000

tor

GLM for partially pooled categorical pre

vari-

1774 *Biometrics*, 000 0000

able

are

GLM for partially pooled categorical pre

$\mathbb{I}_1 = 0$, without documentation

(6)

$\mathbb{I}_2 = 1$, with documentation.

(7)

1776*Biometrics*, 000 0000

The

ran-

GLM for partially pooled categorical pre

dom

1778*Biometrics*, 000 0000

ef-

GLM for partially pooled categorical pre

fect

1780 *Biometrics*, 000 0000

γ_ℓ

GLM for partially pooled categorical pre

has

1782*Biometrics*, 000 0000

dis-

GLM for partially pooled categorical pre

tri-

1784 *Biometrics*, 000 0000

bu-

tion

$$\gamma_\ell | \sigma \sim \text{Normal}(0, \sigma), \quad \ell = 1, \dots$$

(8)

If

GLM for partially pooled categorical pre

all

1788*Biometrics*, 000 0000

data

GLM for partially pooled categorical pre

were

1790 *Biometrics*, 000 0000

in

GLM for partially pooled categorical pre

line

1792*Biometrics*, 000 0000

mode

GLM for partially pooled categorical pre

then

1794 *Biometrics*, 000 0000

the

GLM for partially pooled categorical pre

above

1796 *Biometrics*, 000 0000

model

GLM for partially pooled categorical pre

would

1798 *Biometrics*, 000 0000

be

GLM for partially pooled categorical pre

a

1800*Biometrics*, 000 0000

fairly

GLM for partially pooled categorical pre

stan-

1802 *Biometrics*, 000 0000

dard

GLM for partially pooled categorical pre

mixed

1804*Biometrics*, 000 0000

ef-

GLM for partially pooled categorical pre

fects

1806*Biometrics*, 000 0000

lo-

GLM for partially pooled categorical pre

gis-

1808*Biometrics*, 000 0000

tic

GLM for partially pooled categorical pre

re-

1810*Biometrics*, 000 0000

gres-

GLM for partially pooled categorical pre

sion

1812*Biometrics*, 000 0000

with

GLM for partially pooled categorical pre

cat-

1814 *Biometrics*, 000 0000

e-

GLM for partially pooled categorical pre

gor-

1816*Biometrics*, 000 0000

i-

GLM for partially pooled categorical pre

cal

1818*Biometrics*, 000 0000

vari-

GLM for partially pooled categorical pre

ables.

1820 *Biometrics*, 000 0000

How-

GLM for partially pooled categorical pre

ever,

1822*Biometrics*, 000 0000

be-

GLM for partially pooled categorical pre

cause

1824 *Biometrics*, 000 0000

of

GLM for partially pooled categorical pre

the

1826 *Biometrics*, 000 0000

use

GLM for partially pooled categorical pre

of

1828*Biometrics*, 000 0000

con-

GLM for partially pooled categorical pre

tainer

1830 *Biometrics*, 000 0000

mode

GLM for partially pooled categorical pre

to

1832*Biometrics*, 000 0000

cap-

GLM for partially pooled categorical pre

ture

1834*Biometrics*, 000 0000

the

GLM for partially pooled categorical pre

data,

1836 *Biometrics*, 000 0000

we

GLM for partially pooled categorical pre

don't

1838*Biometrics*, 000 0000

ob-

GLM for partially pooled categorical pre

serve

1840 *Biometrics*, 000 0000

out-

GLM for partially pooled categorical pre

comes

1842*Biometrics*, 000 0000

for

GLM for partially pooled categorical pre

each

1844*Biometrics*, 000 0000

line,

GLM for partially pooled categorical pre

as

1846*Biometrics*, 000 0000

ev-

GLM for partially pooled categorical pre

ery

1848*Biometrics*, 000 0000

line

GLM for partially pooled categorical pre

in

1850 *Biometrics*, 000 0000

the

GLM for partially pooled categorical pre

en-

1852*Biometrics*, 000 0000

try

GLM for partially pooled categorical pre

is

1854*Biometrics*, 000 0000

marked

GLM for partially pooled categorical pre

as

1856 *Biometrics*, 000 0000

non-

GLM for partially pooled categorical pre

compliant

1858*Biometrics*, 000 0000

if

GLM for partially pooled categorical pre

any

1860*Biometrics*, 000 0000

line

GLM for partially pooled categorical pre

in

1862*Biometrics*, 000 0000

the

GLM for partially pooled categorical pre

en-

1864*Biometrics*, 000 0000

try

GLM for partially pooled categorical pre

is

1866*Biometrics*, 000 0000

found

GLM for partially pooled categorical pre

to

1868*Biometrics*, 000 0000

be

GLM for partially pooled categorical pre

non-

1870 *Biometrics*, 000 0000

compliant.

GLM for partially pooled categorical pre

There-

1872*Biometrics*, 000 0000

fore,

GLM for partially pooled categorical pre

the

1874*Biometrics*, 000 0000

out-

GLM for partially pooled categorical pre

come

1876*Biometrics*, 000 0000

is

GLM for partially pooled categorical pre

whether

1878*Biometrics*, 000 0000

the

GLM for partially pooled categorical pre

en-

1880*Biometrics*, 000 0000

try

GLM for partially pooled categorical pre

is

1882*Biometrics*, 000 0000

com-

GLM for partially pooled categorical pre

pli-

1884*Biometrics*, 000 0000

ant

GLM for partially pooled categorical pre

and

1886*Biometrics*, 000 0000

we

GLM for partially pooled categorical pre

need

1888*Biometrics*, 000 0000

to

GLM for partially pooled categorical pre

cal-

1890*Biometrics*, 000 0000

cu-

GLM for partially pooled categorical pre

late

1892*Biometrics*, 000 0000

the

GLM for partially pooled categorical pre

prob-

1894*Biometrics*, 000 0000

a-

GLM for partially pooled categorical pre

bil-

1896*Biometrics*, 000 0000

ity

GLM for partially pooled categorical pre

that

1898*Biometrics*, 000 0000

the

GLM for partially pooled categorical pre

en-

1900*Biometrics*, 000 0000

try

GLM for partially pooled categorical pre

is

1902 *Biometrics*, 000 0000

non-

GLM for partially pooled categorical pre

compliant,

1904*Biometrics*, 000 0000

which

GLM for partially pooled categorical pre

is

1906*Biometrics*, 000 0000

one

GLM for partially pooled categorical pre

mi-

1908*Biometrics*, 000 0000

nus

GLM for partially pooled categorical pre

the

1910*Biometrics*, 000 0000

prob-

GLM for partially pooled categorical pre

a-

1912*Biometrics*, 000 0000

bil-

GLM for partially pooled categorical pre

ity

1914*Biometrics*, 000 0000

that

GLM for partially pooled categorical pre

ev-

1916*Biometrics*, 000 0000

ery

GLM for partially pooled categorical pre

line

1918*Biometrics*, 000 0000

in

GLM for partially pooled categorical pre

the

1920*Biometrics*, 000 0000

en-

GLM for partially pooled categorical pre

try

1922*Biometrics*, 000 0000

is

GLM for partially pooled categorical pre

com-

1924*Biometrics*, 000 0000

pli-

ant:

$$\mathbb{P}(\text{Entry } l \text{ non-compliant}) = q_l$$

(9)

where

GLM for partially pooled categorical pre

p_{ijkl}

1928*Biometrics*, 000 0000

is

GLM for partially pooled categorical pre

the

1930 *Biometrics*, 000 0000

prob-

GLM for partially pooled categorical pre

a-

1932*Biometrics*, 000 0000

bil-

GLM for partially pooled categorical pre

ity

1934*Biometrics*, 000 0000

that

GLM for partially pooled categorical pre

the

1936*Biometrics*, 000 0000

line

GLM for partially pooled categorical pre

with

1938*Biometrics*, 000 0000

in-

GLM for partially pooled categorical pre

dices

1940*Biometrics*, 000 0000

ijkl

GLM for partially pooled categorical pre

is

1942*Biometrics*, 000 0000

non-

GLM for partially pooled categorical pre

compliant,

1944*Biometrics*, 000 0000

cal-

GLM for partially pooled categorical pre

cu-

1946*Biometrics*, 000 0000

lated

GLM for partially pooled categorical pre

from

1948*Biometrics*, 000 0000

Eq. (??).

Hence,

1950 *Biometrics*, 000 0000

for

GLM for partially pooled categorical pre

en-

1952*Biometrics*, 000 0000

tries

GLM for partially pooled categorical pre

in

1954*Biometrics*, 000 0000

con-

GLM for partially pooled categorical pre

tainer

1956*Biometrics*, 000 0000

mode,

GLM for partially pooled categorical pre

we

1958*Biometrics*, 000 0000

treat

GLM for partially pooled categorical pre

the

1960*Biometrics*, 000 0000

en-

GLM for partially pooled categorical pre

try

1962*Biometrics*, 000 0000

as

GLM for partially pooled categorical pre

a

1964*Biometrics*, 000 0000

Bernoulli

GLM for partially pooled categorical pre

ran-

1966*Biometrics*, 000 0000

dom

GLM for partially pooled categorical pre

vari-

1968*Biometrics*, 000 0000

able

GLM for partially pooled categorical pre

with

1970*Biometrics*, 000 0000

prob-

GLM for partially pooled categorical pre

a-

1972*Biometrics*, 000 0000

bil-

GLM for partially pooled categorical pre

ity

1974*Biometrics*, 000 0000

de-

GLM for partially pooled categorical pre

defined

1976*Biometrics*, 000 0000

by

GLM for partially pooled categorical pre

Eq. (??),

1978*Biometrics*, 000 0000

while

GLM for partially pooled categorical pre

for

1980*Biometrics*, 000 0000

en-

GLM for partially pooled categorical pre

tries

1982*Biometrics*, 000 0000

in

GLM for partially pooled categorical pre

line

1984*Biometrics*, 000 0000

mode,

GLM for partially pooled categorical pre

we

1986*Biometrics*, 000 0000

treat

GLM for partially pooled categorical pre

each

1988*Biometrics*, 000 0000

line

GLM for partially pooled categorical pre

as

1990*Biometrics*, 000 0000

a

GLM for partially pooled categorical pre

Bernoulli

1992*Biometrics*, 000 0000

ran-

GLM for partially pooled categorical pre

dom

1994*Biometrics*, 000 0000

vari-

GLM for partially pooled categorical pre

able

1996*Biometrics*, 000 0000

with

GLM for partially pooled categorical pre

prob-

1998*Biometrics*, 000 0000

a-

GLM for partially pooled categorical pre

bil-

2000*Biometrics*, 000 0000

ity

GLM for partially pooled categorical pre

as

2002*Biometrics*, 000 0000

de-

GLM for partially pooled categorical pre

fin

2004*Biometrics*, 000 0000

in

Eq. (??).

GLM for partially pooled categorical pre

This

2006*Biometrics*, 000 0000

pa-

GLM for partially pooled categorical pre

per

2008*Biometrics*, 000 0000

in-

GLM for partially pooled categorical pre

cludes

2010*Biometrics*, 000 0000

three

GLM for partially pooled categorical pre

anal-

2012*Biometrics*, 000 0000

y-

GLM for partially pooled categorical pre

ses:

2014*Biometrics*, 000 0000

an

GLM for partially pooled categorical pre

asymp-

2016*Biometrics*, 000 0000

toxic

GLM for partially pooled categorical pre

anal-

2018*Biometrics*, 000 0000

y-

GLM for partially pooled categorical pre

sis,

a

GLM for partially pooled categorical pre

sim-

2022 *Biometrics*, 000 0000

u-

GLM for partially pooled categorical pre

la-

2024*Biometrics*, 000 0000

tion

GLM for partially pooled categorical pre

study,

2026*Biometrics*, 000 0000

and

GLM for partially pooled categorical pre

a

2028*Biometrics*, 000 0000

case

GLM for partially pooled categorical pre

study

2030 *Biometrics*, 000 0000

of

GLM for partially pooled categorical pre

Aus-

2032*Biometrics*, 000 0000

tralian

GLM for partially pooled categorical pre

biose-

2034*Biometrics*, 000 0000

cu-

GLM for partially pooled categorical pre

urity

data.

GLM for partially pooled categorical pre

For

2038*Biometrics*, 000 0000

the

GLM for partially pooled categorical pre

asymp-

2040 *Biometrics*, 000 0000

totic

GLM for partially pooled categorical pre

anal-

y-

GLM for partially pooled categorical pre

sis

2044*Biometrics*, 000 0000

we

GLM for partially pooled categorical pre

only

2046 *Biometrics*, 000 0000

con-

GLM for partially pooled categorical pre

sider

2048 *Biometrics*, 000 0000

the

GLM for partially pooled categorical pre

item

2050*Biometrics*, 000 0000

type,

GLM for partially pooled categorical pre

ig-

2052*Biometrics*, 000 0000

nor-

GLM for partially pooled categorical pre

ing

2054 *Biometrics*, 000 0000

ef-

GLM for partially pooled categorical pre

fects

2056 *Biometrics*, 000 0000

due

GLM for partially pooled categorical pre

to

2058*Biometrics*, 000 0000

the

GLM for partially pooled categorical pre

coun-

2060 *Biometrics*, 000 0000

try

GLM for partially pooled categorical pre

of

2062 *Biometrics*, 000 0000

ori-

GLM for partially pooled categorical pre

gin,

2064*Biometrics*, 000 0000

doc-

GLM for partially pooled categorical pre

u-

2066*Biometrics*, 000 0000

men-

GLM for partially pooled categorical pre

ta-

2068 *Biometrics*, 000 0000

tion

GLM for partially pooled categorical pre

and

2070 *Biometrics*, 000 0000

en-

GLM for partially pooled categorical pre

try

2072 *Biometrics*, 000 0000

ef-

GLM for partially pooled categorical pre

fect.

2074*Biometrics*, 000 0000

As

GLM for partially pooled categorical pre

such,

2076 *Biometrics*, 000 0000

rather

GLM for partially pooled categorical pre

than

2078*Biometrics*, 000 0000

US-

GLM for partially pooled categorical pre

ing

Eq. (??),

GLM for partially pooled categorical pre

we

2082 *Biometrics*, 000 0000

just

GLM for partially pooled categorical pre

con-

2084 *Biometrics*, 000 0000

sider

GLM for partially pooled categorical pre

the

2086 *Biometrics*, 000 0000

prob-

GLM for partially pooled categorical pre

a-

2088*Biometrics*, 000 0000

bil-

GLM for partially pooled categorical pre

ity

2090 *Biometrics*, 000 0000

that

GLM for partially pooled categorical pre

a

2092*Biometrics*, 000 0000

line

GLM for partially pooled categorical pre

of

2094 *Biometrics*, 000 0000

item

GLM for partially pooled categorical pre

type

2096*Biometrics*, 000 0000

i

GLM for partially pooled categorical pre

is

2098 *Biometrics*, 000 0000

non-

GLM for partially pooled categorical pre

compliant,

2100*Biometrics*, 000 0000

p_i .

GLM for partially pooled categorical pre

The

2102*Biometrics*, 000 0000

sim-

GLM for partially pooled categorical pre

u-

2104 *Biometrics*, 000 0000

la-

GLM for partially pooled categorical pre

tion

study

GLM for partially pooled categorical pre

and

2108 *Biometrics*, 000 0000

the

GLM for partially pooled categorical pre

case

2110 *Biometrics*, 000 0000

study

GLM for partially pooled categorical pre

both

2112 *Biometrics*, 000 0000

use

GLM for partially pooled categorical pre

the

2114 *Biometrics*, 000 0000

full

GLM for partially pooled categorical pre

model,

2116*Biometrics*, 000 0000

as

GLM for partially pooled categorical pre

de-

2118 *Biometrics*, 000 0000

fined

above.

3. Asymptotic

anal-

y-

sis

We

2120 *Biometrics*, 000 0000

asympt-

GLM for partially pooled categorical pre

totic

2122*Biometrics*, 000 0000

anal-

GLM for partially pooled categorical pre

y-

2124 *Biometrics*, 000 0000

sis

GLM for partially pooled categorical pre

to

2126 *Biometrics*, 000 0000

in-

GLM for partially pooled categorical pre

ves-

2128*Biometrics*, 000 0000

ti-

GLM for partially pooled categorical pre

gate

2130 *Biometrics*, 000 0000

how

GLM for partially pooled categorical pre

the

2132*Biometrics*, 000 0000

pre-

GLM for partially pooled categorical pre

ci-

2134*Biometrics*, 000 0000

sion

GLM for partially pooled categorical pre

of

2136 *Biometrics*, 000 0000

es-

2138 *Biometrics*, 000 0000

mates

GLM for partially pooled categorical pre

de-

2140 *Biometrics*, 000 0000

pends

GLM for partially pooled categorical pre

on

2142*Biometrics*, 000 0000

en-

GLM for partially pooled categorical pre

try

2144 *Biometrics*, 000 0000

size,

GLM for partially pooled categorical pre

the

2146 *Biometrics*, 000 0000

num-

GLM for partially pooled categorical pre

ber

2148 *Biometrics*, 000 0000

of

GLM for partially pooled categorical pre

en-

2150 *Biometrics*, 000 0000

tries,

GLM for partially pooled categorical pre

the

2152 *Biometrics*, 000 0000

prob-

GLM for partially pooled categorical pre

a-

2154 *Biometrics*, 000 0000

bil-

GLM for partially pooled categorical pre

ity

2156 *Biometrics*, 000 0000

of

GLM for partially pooled categorical pre

non-

2158 *Biometrics*, 000 0000

compliance

GLM for partially pooled categorical pre

and

2160 *Biometrics*, 000 0000

whether

GLM for partially pooled categorical pre

item

2162 *Biometrics*, 000 0000

types

GLM for partially pooled categorical pre

are

2164 *Biometrics*, 000 0000

mixed.

GLM for partially pooled categorical pre

This

2166 *Biometrics*, 000 0000

anal-

GLM for partially pooled categorical pre

y-

2168 *Biometrics*, 000 0000

sis

GLM for partially pooled categorical pre

com-

2170 *Biometrics*, 000 0000

prises

GLM for partially pooled categorical pre

two

2172 *Biometrics*, 000 0000

parts.

GLM for partially pooled categorical pre

The

2174*Biometrics*, 000 0000

first

GLM for partially pooled categorical pre

as-

2176 *Biometrics*, 000 0000

sumes

GLM for partially pooled categorical pre

that

2178 *Biometrics*, 000 0000

all

GLM for partially pooled categorical pre

items

2180 *Biometrics*, 000 0000

are

GLM for partially pooled categorical pre

a

2182*Biometrics*, 000 0000

sin-

GLM for partially pooled categorical pre

gle

2184 *Biometrics*, 000 0000

type,

GLM for partially pooled categorical pre

which

2186 *Biometrics*, 000 0000

al-

GLM for partially pooled categorical pre

lows

2188*Biometrics*, 000 0000

us

GLM for partially pooled categorical pre

to

2190 *Biometrics*, 000 0000

quan-

GLM for partially pooled categorical pre

tify

2192 *Biometrics*, 000 0000

how

GLM for partially pooled categorical pre

the

2194 *Biometrics*, 000 0000

amount

GLM for partially pooled categorical pre

of

2196 *Biometrics*, 000 0000

data,

GLM for partially pooled categorical pre

prob-

a-

GLM for partially pooled categorical pre

bil-

2200 *Biometrics*, 000 0000

ity

GLM for partially pooled categorical pre

of

2202 *Biometrics*, 000 0000

non-

GLM for partially pooled categorical pre

compliance

2204 *Biometrics*, 000 0000

and

GLM for partially pooled categorical pre

en-

2206 *Biometrics*, 000 0000

try

GLM for partially pooled categorical pre

size

2208*Biometrics*, 000 0000

af-

GLM for partially pooled categorical pre

fect

2210*Biometrics*, 000 0000

pre-

GLM for partially pooled categorical pre

ci-

2212*Biometrics*, 000 0000

sion.

GLM for partially pooled categorical pre

The

2214 *Biometrics*, 000 0000

sec-

GLM for partially pooled categorical pre

ond

2216*Biometrics*, 000 0000

part

GLM for partially pooled categorical pre

as-

2218 *Biometrics*, 000 0000

sumes

GLM for partially pooled categorical pre

that

2220 *Biometrics*, 000 0000

there

GLM for partially pooled categorical pre

are

2222*Biometrics*, 000 0000

two

GLM for partially pooled categorical pre

dif-

2224 *Biometrics*, 000 0000

fer-

GLM for partially pooled categorical pre

ent

2226*Biometrics*, 000 0000

item

GLM for partially pooled categorical pre

types,

2228 *Biometrics*, 000 0000

and

GLM for partially pooled categorical pre

it

2230 *Biometrics*, 000 0000

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GLM for partially pooled categorical pre

plores

2232 *Biometrics*, 000 0000

how

GLM for partially pooled categorical pre

chang-

2234 *Biometrics*, 000 0000

ing

GLM for partially pooled categorical pre

the

2236 *Biometrics*, 000 0000

pro-

GLM for partially pooled categorical pre

por-

2238 *Biometrics*, 000 0000

tion

GLM for partially pooled categorical pre

of

2240 *Biometrics*, 000 0000

en-

GLM for partially pooled categorical pre

tries

2242 *Biometrics*, 000 0000

with

GLM for partially pooled categorical pre

both

2244*Biometrics*, 000 0000

item

GLM for partially pooled categorical pre

types

2246 *Biometrics*, 000 0000

mixed

GLM for partially pooled categorical pre

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2248 *Biometrics*, 000 0000

fects

GLM for partially pooled categorical pre

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2250 *Biometrics*, 000 0000

ci-

sion.

Throughout

2252*Biometrics*, 000 0000

this

GLM for partially pooled categorical pre

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2254 *Biometrics*, 000 0000

tion

GLM for partially pooled categorical pre

we

2256 *Biometrics*, 000 0000

make

GLM for partially pooled categorical pre

two

2258*Biometrics*, 000 0000

sim-

GLM for partially pooled categorical pre

pli-

2260 *Biometrics*, 000 0000

fi-

GLM for partially pooled categorical pre

ca-

tions.

GLM for partially pooled categorical pre

Firstly,

2264 *Biometrics*, 000 0000

we

GLM for partially pooled categorical pre

do

2266 *Biometrics*, 000 0000

not

GLM for partially pooled categorical pre

sep-

2268 *Biometrics*, 000 0000

a-

GLM for partially pooled categorical pre

rate

2270 *Biometrics*, 000 0000

line

GLM for partially pooled categorical pre

mode

2272 *Biometrics*, 000 0000

and

GLM for partially pooled categorical pre

con-

2274 *Biometrics*, 000 0000

tainer

GLM for partially pooled categorical pre

mode

2276 *Biometrics*, 000 0000

be-

GLM for partially pooled categorical pre

cause

2278 *Biometrics*, 000 0000

con-

GLM for partially pooled categorical pre

tainer

2280 *Biometrics*, 000 0000

mode

GLM for partially pooled categorical pre

data

2282 *Biometrics*, 000 0000

with

GLM for partially pooled categorical pre

an

2284 *Biometrics*, 000 0000

en-

GLM for partially pooled categorical pre

try

2286 *Biometrics*, 000 0000

size

GLM for partially pooled categorical pre

of

2288 *Biometrics*, 000 0000

one

GLM for partially pooled categorical pre

is

2290 *Biometrics*, 000 0000

math-

GLM for partially pooled categorical pre

e-

2292 *Biometrics*, 000 0000

mat-

cally

GLM for partially pooled categorical pre

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GLM for partially pooled categorical pre

lent

2298 *Biometrics*, 000 0000

to

GLM for partially pooled categorical pre

line

2300 *Biometrics*, 000 0000

mode

GLM for partially pooled categorical pre

data.

Hence,

GLM for partially pooled categorical pre

through-

2304 *Biometrics*, 000 0000

out

GLM for partially pooled categorical pre

these

2306 *Biometrics*, 000 0000

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GLM for partially pooled categorical pre

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2308 *Biometrics*, 000 0000

sis,

GLM for partially pooled categorical pre

an

2310*Biometrics*, 000 0000

en-

GLM for partially pooled categorical pre

try

2312*Biometrics*, 000 0000

size

GLM for partially pooled categorical pre

of

2314 *Biometrics*, 000 0000

one

GLM for partially pooled categorical pre

means

2316*Biometrics*, 000 0000

line

GLM for partially pooled categorical pre

mode

2318 *Biometrics*, 000 0000

and

GLM for partially pooled categorical pre

en-

2320 *Biometrics*, 000 0000

try

GLM for partially pooled categorical pre

size

2322 *Biometrics*, 000 0000

greater

GLM for partially pooled categorical pre

than

2324 *Biometrics*, 000 0000

one

GLM for partially pooled categorical pre

im-

2326 *Biometrics*, 000 0000

plies

GLM for partially pooled categorical pre

con-

2328 *Biometrics*, 000 0000

tainer

GLM for partially pooled categorical pre

mode.

2330 *Biometrics*, 000 0000

Sec-

GLM for partially pooled categorical pre

ondly,

2332 *Biometrics*, 000 0000

we

GLM for partially pooled categorical pre

as-

2334 *Biometrics*, 000 0000

sume

GLM for partially pooled categorical pre

that

2336 *Biometrics*, 000 0000

each

GLM for partially pooled categorical pre

item

2338 *Biometrics*, 000 0000

has

GLM for partially pooled categorical pre

a

2340 *Biometrics*, 000 0000

fixed

GLM for partially pooled categorical pre

prob-

2342*Biometrics*, 000 0000

a-

GLM for partially pooled categorical pre

bil-

2344*Biometrics*, 000 0000

ity

GLM for partially pooled categorical pre

of

2346 *Biometrics*, 000 0000

non-

GLM for partially pooled categorical pre

compliance.

2348 *Biometrics*, 000 0000

As

GLM for partially pooled categorical pre

such,

2350 *Biometrics*, 000 0000

any

GLM for partially pooled categorical pre

un-

2352*Biometrics*, 000 0000

cer-

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3.1 *Single*

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is

$$\mathbb{P}(\text{entry compliant}) = (1 - p)^S,$$

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to

$$\mathcal{L}_S = \left(1 - (1 - p)^S\right)^I (1 - p)^S$$

1)

Therefore,

the

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2628 *Biometrics*, 000 0000

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is

$$\log \mathcal{L}_S = I \log (1 - (1 - p)^S) +$$

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2630 *Biometrics*, 000 0000

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2652 *Biometrics*, 000 0000

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trix):

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$$\left[\frac{\partial^2 \log \mathcal{L}_S}{\partial p^2} \right] = \frac{S \left(N + \frac{I((1+S)(1-p))}{(1-p)} \right)}{(1-p)^2}$$

.3)

2656 *Biometrics*, 000 0000

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2660 *Biometrics*, 000 0000

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$$\mathbb{E} [I] = N(1 - (1 - p)^S).$$

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Hence

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2696 *Biometrics*, 000 0000

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is

$$\mathcal{I} = -\mathbb{E} \left[\frac{\partial^2 \log \mathcal{L}_S}{\partial p^2} \right] = -\frac{NS^2($$

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2704 *Biometrics*, 000 0000

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2706 *Biometrics*, 000 0000

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is

$$SE = \left(-\frac{NS^2(1-p)^{S-2}}{(1-p)^S - 1} \right)^{-1/2}$$

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2708 *Biometrics*, 000 0000

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2942 *Biometrics*, 000 0000

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2944 *Biometrics*, 000 0000

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3.2 *Two*

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2946 *Biometrics*, 000 0000

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2948 *Biometrics*, 000 0000

we

GLM for partially pooled categorical pre

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2950 *Biometrics*, 000 0000

sider

GLM for partially pooled categorical pre

a

2952 *Biometrics*, 000 0000

sit-

GLM for partially pooled categorical pre

u-

2954 *Biometrics*, 000 0000

a-

GLM for partially pooled categorical pre

tion

where

GLM for partially pooled categorical pre

there

2958 *Biometrics*, 000 0000

are

GLM for partially pooled categorical pre

two

2960 *Biometrics*, 000 0000

items

GLM for partially pooled categorical pre

with

2962 *Biometrics*, 000 0000

prob-

GLM for partially pooled categorical pre

a-

2964 *Biometrics*, 000 0000

bil-

2966 *Biometrics*, 000 0000

ties

GLM for partially pooled categorical pre

of

2968 *Biometrics*, 000 0000

non-

GLM for partially pooled categorical pre

compliance

2970 *Biometrics*, 000 0000

of

GLM for partially pooled categorical pre

p_1

2972 *Biometrics*, 000 0000

and

GLM for partially pooled categorical pre

$p_2,$

2974 *Biometrics*, 000 0000

and

GLM for partially pooled categorical pre

we

2976 *Biometrics*, 000 0000

ex-

GLM for partially pooled categorical pre

am-

2978*Biometrics*, 000 0000

ine

GLM for partially pooled categorical pre

how

2980 *Biometrics*, 000 0000

these

GLM for partially pooled categorical pre

dif-

2982 *Biometrics*, 000 0000

fer-

GLM for partially pooled categorical pre

ent

2984 *Biometrics*, 000 0000

items

GLM for partially pooled categorical pre

prob-

2986 *Biometrics*, 000 0000

a-

GLM for partially pooled categorical pre

bil-

2988*Biometrics*, 000 0000

i-

GLM for partially pooled categorical pre

ties

2990 *Biometrics*, 000 0000

in-

GLM for partially pooled categorical pre

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2992*Biometrics*, 000 0000

act.

GLM for partially pooled categorical pre

We

2994 *Biometrics*, 000 0000

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GLM for partially pooled categorical pre

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2996 *Biometrics*, 000 0000

on

GLM for partially pooled categorical pre

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2998*Biometrics*, 000 0000

sce-

GLM for partially pooled categorical pre

nario

3000*Biometrics*, 000 0000

where

GLM for partially pooled categorical pre

ev-

3002*Biometrics*, 000 0000

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GLM for partially pooled categorical pre

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3004*Biometrics*, 000 0000

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is

3006*Biometrics*, 000 0000

of

GLM for partially pooled categorical pre

size

3008*Biometrics*, 000 0000

two,

GLM for partially pooled categorical pre

mean-

3010*Biometrics*, 000 0000

ing

GLM for partially pooled categorical pre

there

3012*Biometrics*, 000 0000

are

GLM for partially pooled categorical pre

three

3014*Biometrics*, 000 0000

types

GLM for partially pooled categorical pre

of

3016*Biometrics*, 000 0000

en-

GLM for partially pooled categorical pre

tries:

3018*Biometrics*, 000 0000

only

GLM for partially pooled categorical pre

type

3020*Biometrics*, 000 0000

1;

GLM for partially pooled categorical pre

only

3022*Biometrics*, 000 0000

type

GLM for partially pooled categorical pre

2;

3024 *Biometrics*, 000 0000

or

GLM for partially pooled categorical pre

mixed,

3026 *Biometrics*, 000 0000

with

GLM for partially pooled categorical pre

one

3028*Biometrics*, 000 0000

line

GLM for partially pooled categorical pre

of

3030*Biometrics*, 000 0000

type

3032 *Biometrics*, 000 0000

and

GLM for partially pooled categorical pre

one

3034 *Biometrics*, 000 0000

of

GLM for partially pooled categorical pre

type

2.

We

3038 *Biometrics*, 000 0000

de-

GLM for partially pooled categorical pre

note

3040 *Biometrics*, 000 0000

the

GLM for partially pooled categorical pre

num-

3042 *Biometrics*, 000 0000

ber

GLM for partially pooled categorical pre

of

3044*Biometrics*, 000 0000

lines

GLM for partially pooled categorical pre

within

3046 *Biometrics*, 000 0000

a

GLM for partially pooled categorical pre

sin-

3048 *Biometrics*, 000 0000

gle

GLM for partially pooled categorical pre

en-

3050 *Biometrics*, 000 0000

try

GLM for partially pooled categorical pre

of

3052*Biometrics*, 000 0000

type

3054 *Biometrics*, 000 0000

and

3056*Biometrics*, 000 0000

as

GLM for partially pooled categorical pre

S_1

3058 *Biometrics*, 000 0000

and

GLM for partially pooled categorical pre

S_2

3060 *Biometrics*, 000 0000

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GLM for partially pooled categorical pre

spec-

tively,

GLM for partially pooled categorical pre

and

$$I(S_1, S_2$$

GLM for partially pooled categorical pre

and

$$N(S_1, S_2)$$

GLM for partially pooled categorical pre

are

3068 *Biometrics*, 000 0000

the

GLM for partially pooled categorical pre

num-

3070 *Biometrics*, 000 0000

ber

GLM for partially pooled categorical pre

of

3072*Biometrics*, 000 0000

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GLM for partially pooled categorical pre

tries

3074 *Biometrics*, 000 0000

with

GLM for partially pooled categorical pre

non-

3076 *Biometrics*, 000 0000

compliance

GLM for partially pooled categorical pre

and

3078 *Biometrics*, 000 0000

to-

GLM for partially pooled categorical pre

tal

3080 *Biometrics*, 000 0000

num-

GLM for partially pooled categorical pre

ber

3082 *Biometrics*, 000 0000

of

GLM for partially pooled categorical pre

en-

3084 *Biometrics*, 000 0000

tries

GLM for partially pooled categorical pre

with

3086 *Biometrics*, 000 0000

S_1

GLM for partially pooled categorical pre

type

3088*Biometrics*, 000 0000

1

GLM for partially pooled categorical pre

lines

3090 *Biometrics*, 000 0000

and

GLM for partially pooled categorical pre

S_2

3092*Biometrics*, 000 0000

type

3094 *Biometrics*, 000 0000

lines.

GLM for partially pooled categorical pre

For

3096 *Biometrics*, 000 0000

our

GLM for partially pooled categorical pre

case,

3098 *Biometrics*, 000 0000

we

GLM for partially pooled categorical pre

can

3100 *Biometrics*, 000 0000

have

GLM for partially pooled categorical pre

$$S_1 =$$

3102 *Biometrics*, 000 0000

$$2, S_2 =$$

GLM for partially pooled categorical pre

0;

3104 *Biometrics*, 000 0000

$$S_1 =$$

GLM for partially pooled categorical pre

$$1, S_2 =$$

3106 *Biometrics*, 000 0000

1;

GLM for partially pooled categorical pre

or

3108 *Biometrics*, 000 0000

$$S_1 =$$

GLM for partially pooled categorical pre

$$0, S_2 =$$

3110 *Biometrics*, 000 0000

2.

GLM for partially pooled categorical pre

Rewrit-

3112 *Biometrics*, 000 0000

ing

GLM for partially pooled categorical pre

the

3114 *Biometrics*, 000 0000

log-

GLM for partially pooled categorical pre

likelihood

3116*Biometrics*, 000 0000

from

GLM for partially pooled categorical pre

Eq. (??),

3118 *Biometrics*, 000 0000

we

get

$$\log \mathcal{L} = \sum_{S_1, S_2} I(S_1, S_2) \log \left(1 - (1 - p_1)^{S_1} (1 - p_2)^{S_2} \right) + \\ (N(S_1, S_2) - I(S_1, S_2)) \log \left((1 - p_1)^{S_1} (1 - p_2)^{S_2} \right) .$$

7)

3120*Biometrics*, 000 0000

We

com-

GLM for partially pooled categorical pre

pute

3122*Biometrics*, 000 0000

the

GLM for partially pooled categorical pre

Fisher

3124*Biometrics*, 000 0000

in-

GLM for partially pooled categorical pre

for-

3126 *Biometrics*, 000 0000

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tion

3128*Biometrics*, 000 0000

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GLM for partially pooled categorical pre

trix

3130 *Biometrics*, 000 0000

and

GLM for partially pooled categorical pre

the

3132*Biometrics*, 000 0000

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GLM for partially pooled categorical pre

dard

3134 *Biometrics*, 000 0000

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GLM for partially pooled categorical pre

FOR

3136 *Biometrics*, 000 0000

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ing

3138 *Biometrics*, 000 0000

Math-

GLM for partially pooled categorical pre

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3140 *Biometrics*, 000 0000

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GLM for partially pooled categorical pre

ica.

3142*Biometrics*, 000 0000

The

GLM for partially pooled categorical pre

stan-

3144 *Biometrics*, 000 0000

dard

GLM for partially pooled categorical pre

er-

3146 *Biometrics*, 000 0000

FOR

GLM for partially pooled categorical pre

for

3148 *Biometrics*, 000 0000

p_1

is

GLM for partially pooled categorical pre

$$\frac{1}{2} \sqrt{-\frac{p_1 (p_1^2 - 3p_1 + 2) (N_{1,2}(p_1 - 1))}{N_{1,1}(p_1 - 1)(N_{1,2}(p_1 - 1))}}$$

(8)

where

$$N_{1,1}$$

GLM for partially pooled categorical pre

and

3152*Biometrics*, 000 0000

$N_{2,2}$

GLM for partially pooled categorical pre

are

3154 *Biometrics*, 000 0000

the

GLM for partially pooled categorical pre

num-

3156 *Biometrics*, 000 0000

ber

GLM for partially pooled categorical pre

of

3158*Biometrics*, 000 0000

en-

GLM for partially pooled categorical pre

tries

3160 *Biometrics*, 000 0000

with

GLM for partially pooled categorical pre

two

3162*Biometrics*, 000 0000

type

3164 *Biometrics*, 000 0000

lines

GLM for partially pooled categorical pre

and

3166 *Biometrics*, 000 0000

two

GLM for partially pooled categorical pre

type

3168 *Biometrics*, 000 0000

2

GLM for partially pooled categorical pre

lines

3170 *Biometrics*, 000 0000

re-

GLM for partially pooled categorical pre

spec-

tively,

GLM for partially pooled categorical pre

while

3174 *Biometrics*, 000 0000

$N_{1,2}$

GLM for partially pooled categorical pre

are

3176 *Biometrics*, 000 0000

the

GLM for partially pooled categorical pre

num-

3178*Biometrics*, 000 0000

ber

GLM for partially pooled categorical pre

of

3180 *Biometrics*, 000 0000

en-

GLM for partially pooled categorical pre

tries

3182 *Biometrics*, 000 0000

with

GLM for partially pooled categorical pre

both

3184 *Biometrics*, 000 0000

type

3186 *Biometrics*, 000 0000

and

GLM for partially pooled categorical pre

type

3188*Biometrics*, 000 0000

2

GLM for partially pooled categorical pre

lines.

3190 *Biometrics*, 000 0000

The

GLM for partially pooled categorical pre

stan-

3192*Biometrics*, 000 0000

dard

GLM for partially pooled categorical pre

er-

3194 *Biometrics*, 000 0000

FOR

GLM for partially pooled categorical pre

for

3196 *Biometrics*, 000 0000

p_2

GLM for partially pooled categorical pre

is

3198 *Biometrics*, 000 0000

the

GLM for partially pooled categorical pre

same,

3200 *Biometrics*, 000 0000

with

GLM for partially pooled categorical pre

$N_{1,1}$

3202 *Biometrics*, 000 0000

and

GLM for partially pooled categorical pre

$N_{2,2}$

3204 *Biometrics*, 000 0000

switched

GLM for partially pooled categorical pre

and

3206 *Biometrics*, 000 0000

p_1

GLM for partially pooled categorical pre

and

3208 *Biometrics*, 000 0000

p_2

switched.

GLM for partially pooled categorical pre

By

3210*Biometrics*, 000 0000

ex-

GLM for partially pooled categorical pre

am-

3212*Biometrics*, 000 0000

in-

GLM for partially pooled categorical pre

ing

Eq. (??)

GLM for partially pooled categorical pre

we

3216*Biometrics*, 000 0000

can

GLM for partially pooled categorical pre

see

3218*Biometrics*, 000 0000

that

GLM for partially pooled categorical pre

the

3220 *Biometrics*, 000 0000

be-

GLM for partially pooled categorical pre

haviour

3222*Biometrics*, 000 0000

of

GLM for partially pooled categorical pre

the

3224*Biometrics*, 000 0000

stan-

GLM for partially pooled categorical pre

dard

3226 *Biometrics*, 000 0000

er-

GLM for partially pooled categorical pre

riors

3228 *Biometrics*, 000 0000

is

GLM for partially pooled categorical pre

more

3230*Biometrics*, 000 0000

com-

GLM for partially pooled categorical pre

plex

3232 *Biometrics*, 000 0000

than

GLM for partially pooled categorical pre

when

3234 *Biometrics*, 000 0000

we

GLM for partially pooled categorical pre

con-

3236 *Biometrics*, 000 0000

sid-

GLM for partially pooled categorical pre

ered

3238 *Biometrics*, 000 0000

only

GLM for partially pooled categorical pre

one

3240*Biometrics*, 000 0000

type

GLM for partially pooled categorical pre

of

3242*Biometrics*, 000 0000

item.

GLM for partially pooled categorical pre

No-

3244*Biometrics*, 000 0000

tably,

GLM for partially pooled categorical pre

the

3246 *Biometrics*, 000 0000

num-

GLM for partially pooled categorical pre

ber

3248 *Biometrics*, 000 0000

of

GLM for partially pooled categorical pre

en-

3250 *Biometrics*, 000 0000

tries

GLM for partially pooled categorical pre

of

3252 *Biometrics*, 000 0000

only

GLM for partially pooled categorical pre

type

3254 *Biometrics*, 000 0000

2,

GLM for partially pooled categorical pre

$N_{2,2},$

3256 *Biometrics*, 000 0000

is

GLM for partially pooled categorical pre

in

3258 *Biometrics*, 000 0000

the

GLM for partially pooled categorical pre

equa-

3260 *Biometrics*, 000 0000

tion

GLM for partially pooled categorical pre

for

3262 *Biometrics*, 000 0000

the

GLM for partially pooled categorical pre

type

3264 *Biometrics*, 000 0000

1

GLM for partially pooled categorical pre

stan-

3266 *Biometrics*, 000 0000

dard

GLM for partially pooled categorical pre

er-

3268 *Biometrics*, 000 0000

FOR,

GLM for partially pooled categorical pre

along

3270 *Biometrics*, 000 0000

with

GLM for partially pooled categorical pre

the

3272 *Biometrics*, 000 0000

prob-

GLM for partially pooled categorical pre

a-

3274 *Biometrics*, 000 0000

bil-

GLM for partially pooled categorical pre

ity

3276 *Biometrics*, 000 0000

of

GLM for partially pooled categorical pre

non-

3278 *Biometrics*, 000 0000

compliance

GLM for partially pooled categorical pre

of

3280 *Biometrics*, 000 0000

type

GLM for partially pooled categorical pre

2,

p_2 .

Figure ??

GLM for partially pooled categorical pre

shows

3284 *Biometrics*, 000 0000

how

GLM for partially pooled categorical pre

the

3286 *Biometrics*, 000 0000

stan-

GLM for partially pooled categorical pre

dard

3288 *Biometrics*, 000 0000

er-

GLM for partially pooled categorical pre

FOR

3290 *Biometrics*, 000 0000

varies

GLM for partially pooled categorical pre

with

3292 *Biometrics*, 000 0000

the

GLM for partially pooled categorical pre

pro-

3294 *Biometrics*, 000 0000

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tion

3296 *Biometrics*, 000 0000

of

GLM for partially pooled categorical pre

mixed

3298 *Biometrics*, 000 0000

en-

GLM for partially pooled categorical pre

tries,

3300 *Biometrics*, 000 0000

for

GLM for partially pooled categorical pre

dif-

3302 *Biometrics*, 000 0000

fer-

GLM for partially pooled categorical pre

ent

3304 *Biometrics*, 000 0000

non-

GLM for partially pooled categorical pre

compliance

3306 *Biometrics*, 000 0000

prob-

GLM for partially pooled categorical pre

a-

3308*Biometrics*, 000 0000

bil-

3310 *Biometrics*, 000 0000

ties.

GLM for partially pooled categorical pre

Here

3312 *Biometrics*, 000 0000

we

GLM for partially pooled categorical pre

fix

3314 *Biometrics*, 000 0000

$$N_{\text{total}} =$$

50,

3316*Biometrics*, 000 0000

and

GLM for partially pooled categorical pre

keep

3318 *Biometrics*, 000 0000

$$N_{1,1} =$$

GLM for partially pooled categorical pre

$N_{2,2}$

3320 *Biometrics*, 000 0000

while

GLM for partially pooled categorical pre

the

3322*Biometrics*, 000 0000

pro-

GLM for partially pooled categorical pre

por-

3324 *Biometrics*, 000 0000

tion

GLM for partially pooled categorical pre

$$N_{1,2}/N_{\text{total}}$$

3326 *Biometrics*, 000 0000

is

GLM for partially pooled categorical pre

var-

ied.

GLM for partially pooled categorical pre

In

3330 *Biometrics*, 000 0000

each

GLM for partially pooled categorical pre

case,

3332*Biometrics*, 000 0000

we

GLM for partially pooled categorical pre

hold

3334 *Biometrics*, 000 0000

p_1

GLM for partially pooled categorical pre

at

3336 *Biometrics*, 000 0000

0.1,

GLM for partially pooled categorical pre

and

3338 *Biometrics*, 000 0000

we

GLM for partially pooled categorical pre

vary

3340 *Biometrics*, 000 0000

p_2

GLM for partially pooled categorical pre

for

3342 *Biometrics*, 000 0000

0.05

GLM for partially pooled categorical pre

up

3344 *Biometrics*, 000 0000

to

GLM for partially pooled categorical pre

0.9

3346 *Biometrics*, 000 0000

across

GLM for partially pooled categorical pre

the

3348 *Biometrics*, 000 0000

four

GLM for partially pooled categorical pre

plots.

3350 *Biometrics*, 000 0000

The

GLM for partially pooled categorical pre

way

3352 *Biometrics*, 000 0000

that

GLM for partially pooled categorical pre

the

3354 *Biometrics*, 000 0000

stan-

GLM for partially pooled categorical pre

dard

3356 *Biometrics*, 000 0000

er-

GLM for partially pooled categorical pre

FOR

3358 *Biometrics*, 000 0000

changes

GLM for partially pooled categorical pre

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GLM for partially pooled categorical pre

func-

3362 *Biometrics*, 000 0000

tion

GLM for partially pooled categorical pre

of

3364 *Biometrics*, 000 0000

the

GLM for partially pooled categorical pre

pro-

3366 *Biometrics*, 000 0000

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GLM for partially pooled categorical pre

tion

3368 *Biometrics*, 000 0000

of

GLM for partially pooled categorical pre

mixed

3370 *Biometrics*, 000 0000

en-

GLM for partially pooled categorical pre

tries

3372 *Biometrics*, 000 0000

changes

markedly,

3374 *Biometrics*, 000 0000

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GLM for partially pooled categorical pre

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3376 *Biometrics*, 000 0000

ing

GLM for partially pooled categorical pre

on

3378 *Biometrics*, 000 0000

the

GLM for partially pooled categorical pre

value

3380 *Biometrics*, 000 0000

of

GLM for partially pooled categorical pre

p_2 .

3382 *Biometrics*, 000 0000

In

GLM for partially pooled categorical pre

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3384 *Biometrics*, 000 0000

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3386 *Biometrics*, 000 0000

lar,

GLM for partially pooled categorical pre

when

3388 *Biometrics*, 000 0000

p_2

GLM for partially pooled categorical pre

is

3390 *Biometrics*, 000 0000

0.7

GLM for partially pooled categorical pre

and

3392 *Biometrics*, 000 0000

0.9,

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the

3394 *Biometrics*, 000 0000

stan-

GLM for partially pooled categorical pre

dard

3396 *Biometrics*, 000 0000

er-

GLM for partially pooled categorical pre

FOR

3398 *Biometrics*, 000 0000

for

GLM for partially pooled categorical pre

p_1

3400*Biometrics*, 000 0000

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GLM for partially pooled categorical pre

creases

3402*Biometrics*, 000 0000

as

GLM for partially pooled categorical pre

the

3404 *Biometrics*, 000 0000

pro-

GLM for partially pooled categorical pre

por-

3406 *Biometrics*, 000 0000

tion

GLM for partially pooled categorical pre

of

3408 *Biometrics*, 000 0000

mixed

GLM for partially pooled categorical pre

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3410 *Biometrics*, 000 0000

tries

GLM for partially pooled categorical pre

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3412*Biometrics*, 000 0000

creases,

GLM for partially pooled categorical pre

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3414 *Biometrics*, 000 0000

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GLM for partially pooled categorical pre

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3416*Biometrics*, 000 0000

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GLM for partially pooled categorical pre

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3418 *Biometrics*, 000 0000

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GLM for partially pooled categorical pre

for

3420 *Biometrics*, 000 0000

p_2

GLM for partially pooled categorical pre

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3422*Biometrics*, 000 0000

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GLM for partially pooled categorical pre

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3424 *Biometrics*, 000 0000

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GLM for partially pooled categorical pre

creases,

3426 *Biometrics*, 000 0000

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GLM for partially pooled categorical pre

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3428*Biometrics*, 000 0000

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GLM for partially pooled categorical pre

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3430 *Biometrics*, 000 0000

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of

3432*Biometrics*, 000 0000

mixed

GLM for partially pooled categorical pre

en-

3434 *Biometrics*, 000 0000

tries

GLM for partially pooled categorical pre

is

3436 *Biometrics*, 000 0000

be-

GLM for partially pooled categorical pre

low

3438 *Biometrics*, 000 0000

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90%.

GLM for partially pooled categorical pre

[Figure 2

GLM for partially pooled categorical pre

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3.3 *Asymptotic*

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GLM for partially pooled categorical pre

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3444*Biometrics*, 000 0000

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3446 *Biometrics*, 000 0000

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GLM for partially pooled categorical pre

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3448 *Biometrics*, 000 0000

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GLM for partially pooled categorical pre

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3450 *Biometrics*, 000 0000

two

GLM for partially pooled categorical pre

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3452*Biometrics*, 000 0000

ser-

GLM for partially pooled categorical pre

va-

3454 *Biometrics*, 000 0000

tions:

(1)

3456*Biometrics*, 000 0000

Container

GLM for partially pooled categorical pre

mode

3458 *Biometrics*, 000 0000

data

GLM for partially pooled categorical pre

are

3460 *Biometrics*, 000 0000

most

GLM for partially pooled categorical pre

use-

3462 *Biometrics*, 000 0000

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GLM for partially pooled categorical pre

when

3464 *Biometrics*, 000 0000

the

GLM for partially pooled categorical pre

prob-

3466 *Biometrics*, 000 0000

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GLM for partially pooled categorical pre

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3468 *Biometrics*, 000 0000

ity

GLM for partially pooled categorical pre

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3470 *Biometrics*, 000 0000

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GLM for partially pooled categorical pre

compliance,

p ,

GLM for partially pooled categorical pre

is

small.

GLM for partially pooled categorical pre

In

3476 *Biometrics*, 000 0000

the

GLM for partially pooled categorical pre

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3478 *Biometrics*, 000 0000

treme

GLM for partially pooled categorical pre

case

where

GLM for partially pooled categorical pre

$$p \rightarrow$$

3482 *Biometrics*, 000 0000

0,

GLM for partially pooled categorical pre

con-

3484 *Biometrics*, 000 0000

tainer

GLM for partially pooled categorical pre

mode

3486 *Biometrics*, 000 0000

data

GLM for partially pooled categorical pre

are

equiv-

GLM for partially pooled categorical pre

a-

3490 *Biometrics*, 000 0000

lent

GLM for partially pooled categorical pre

to

3492*Biometrics*, 000 0000

line

GLM for partially pooled categorical pre

mode

data

GLM for partially pooled categorical pre

be-

3496 *Biometrics*, 000 0000

cause

GLM for partially pooled categorical pre

when-

3498 *Biometrics*, 000 0000

ever

GLM for partially pooled categorical pre

an

3500*Biometrics*, 000 0000

en-

GLM for partially pooled categorical pre

try

3502 *Biometrics*, 000 0000

is

GLM for partially pooled categorical pre

found

3504 *Biometrics*, 000 0000

to

GLM for partially pooled categorical pre

be

3506*Biometrics*, 000 0000

com-

GLM for partially pooled categorical pre

pli-

3508*Biometrics*, 000 0000

ant,

GLM for partially pooled categorical pre

we

3510 *Biometrics*, 000 0000

know

GLM for partially pooled categorical pre

that

3512*Biometrics*, 000 0000

ev-

GLM for partially pooled categorical pre

ery

3514 *Biometrics*, 000 0000

line

GLM for partially pooled categorical pre

within

3516*Biometrics*, 000 0000

that

GLM for partially pooled categorical pre

en-

3518 *Biometrics*, 000 0000

try

GLM for partially pooled categorical pre

is

3520 *Biometrics*, 000 0000

com-

GLM for partially pooled categorical pre

pli-

3522*Biometrics*, 000 0000

ant,

GLM for partially pooled categorical pre

re-

3524 *Biometrics*, 000 0000

gard-

GLM for partially pooled categorical pre

less

3526 *Biometrics*, 000 0000

of

GLM for partially pooled categorical pre

whether

3528 *Biometrics*, 000 0000

it

GLM for partially pooled categorical pre

is

3530 *Biometrics*, 000 0000

con-

GLM for partially pooled categorical pre

tainer

3532 *Biometrics*, 000 0000

mode

GLM for partially pooled categorical pre

or

line

mode.

GLM for partially pooled categorical pre

(2)

3536 *Biometrics*, 000 0000

By

GLM for partially pooled categorical pre

al-

3538 *Biometrics*, 000 0000

low-

GLM for partially pooled categorical pre

ing

3540 *Biometrics*, 000 0000

en-

GLM for partially pooled categorical pre

tries

3542 *Biometrics*, 000 0000

to

GLM for partially pooled categorical pre

con-

3544 *Biometrics*, 000 0000

tain

GLM for partially pooled categorical pre

lines

3546 *Biometrics*, 000 0000

of

GLM for partially pooled categorical pre

dif-

3548 *Biometrics*, 000 0000

fer-

GLM for partially pooled categorical pre

ent

3550 *Biometrics*, 000 0000

item

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4. Simulation

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$$\text{logit}(p_{ijkl}) = \alpha_i + \beta \mathbb{I}_j + \delta_k + \gamma_l$$

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$$\gamma_\ell | \sigma \sim \text{Normal}(0, \sigma), \quad \ell = 1, \dots$$

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$$\alpha_i \sim \text{Normal}(-4, 4), \quad i = 1, \dots$$

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$$\beta \sim \text{Normal}(0, 0.5),$$

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4108 *Biometrics*, 000 0000

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4774 *Biometrics*, 000 0000

given

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in

4776 *Biometrics*, 000 0000

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[Table 2

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about

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4780 *Biometrics*, 000 0000

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4782 *Biometrics*, 000 0000

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STAN

4784 *Biometrics*, 000 0000

model

GLM for partially pooled categorical pre

to

4786 *Biometrics*, 000 0000

the

GLM for partially pooled categorical pre

data

4788 *Biometrics*, 000 0000

from

GLM for partially pooled categorical pre

each

4790 *Biometrics*, 000 0000

week,

GLM for partially pooled categorical pre

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4792 *Biometrics*, 000 0000

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GLM for partially pooled categorical pre

all

4794 *Biometrics*, 000 0000

the

GLM for partially pooled categorical pre

data

4796 *Biometrics*, 000 0000

and

GLM for partially pooled categorical pre

the

4798 *Biometrics*, 000 0000

line-

GLM for partially pooled categorical pre

only

4800*Biometrics*, 000 0000

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set

4802 *Biometrics*, 000 0000

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4804 *Biometrics*, 000 0000

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GLM for partially pooled categorical pre

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4806 *Biometrics*, 000 0000

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4808 *Biometrics*, 000 0000

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4810 *Biometrics*, 000 0000

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GLM for partially pooled categorical pre

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4812*Biometrics*, 000 0000

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GLM for partially pooled categorical pre

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4814 *Biometrics*, 000 0000

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4816*Biometrics*, 000 0000

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4818*Biometrics*, 000 0000

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4820 *Biometrics*, 000 0000

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4822 *Biometrics*, 000 0000

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4824 *Biometrics*, 000 0000

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4826*Biometrics*, 000 0000

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GLM for partially pooled categorical pre

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4828*Biometrics*, 000 0000

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4830 *Biometrics*, 000 0000

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4832 *Biometrics*, 000 0000

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4834 *Biometrics*, 000 0000

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4836 *Biometrics*, 000 0000

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4838*Biometrics*, 000 0000

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4840 *Biometrics*, 000 0000

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4842 *Biometrics*, 000 0000

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4844 *Biometrics*, 000 0000

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4846 *Biometrics*, 000 0000

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4848 *Biometrics*, 000 0000

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4850 *Biometrics*, 000 0000

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4856*Biometrics*, 000 0000

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4858*Biometrics*, 000 0000

to

GLM for partially pooled categorical pre

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4860 *Biometrics*, 000 0000

how

GLM for partially pooled categorical pre

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4862 *Biometrics*, 000 0000

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GLM for partially pooled categorical pre

we

4864 *Biometrics*, 000 0000

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4866 *Biometrics*, 000 0000

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4868*Biometrics*, 000 0000

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4870 *Biometrics*, 000 0000

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4872 *Biometrics*, 000 0000

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4874 *Biometrics*, 000 0000

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4876 *Biometrics*, 000 0000

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4880 *Biometrics*, 000 0000

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4890 *Biometrics*, 000 0000

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4896 *Biometrics*, 000 0000

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4898*Biometrics*, 000 0000

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4900 *Biometrics*, 000 0000

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4902 *Biometrics*, 000 0000

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4904 *Biometrics*, 000 0000

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4906 *Biometrics*, 000 0000

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4908 *Biometrics*, 000 0000

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GLM for partially pooled categorical pre

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4910 *Biometrics*, 000 0000

are

GLM for partially pooled categorical pre

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4912*Biometrics*, 000 0000

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GLM for partially pooled categorical pre

mode

4914 *Biometrics*, 000 0000

and

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that

4916*Biometrics*, 000 0000

line

GLM for partially pooled categorical pre

mode

4918*Biometrics*, 000 0000

data

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gives

4920 *Biometrics*, 000 0000

more

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4922 *Biometrics*, 000 0000

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4924 *Biometrics*, 000 0000

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4926*Biometrics*, 000 0000

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4928 *Biometrics*, 000 0000

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4930 *Biometrics*, 000 0000

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4932*Biometrics*, 000 0000

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4934 *Biometrics*, 000 0000

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4936 *Biometrics*, 000 0000

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4938 *Biometrics*, 000 0000

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4948*Biometrics*, 000 0000

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4950 *Biometrics*, 000 0000

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4952 *Biometrics*, 000 0000

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4954 *Biometrics*, 000 0000

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4956 *Biometrics*, 000 0000

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4960 *Biometrics*, 000 0000

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[Figure 5

GLM for partially pooled categorical pre

about

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Analysing

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the

4968 *Biometrics*, 000 0000

full

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data

4970 *Biometrics*, 000 0000

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4972 *Biometrics*, 000 0000

than

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the

4974 *Biometrics*, 000 0000

line-

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only

4976 *Biometrics*, 000 0000

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4978 *Biometrics*, 000 0000

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4980 *Biometrics*, 000 0000

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ma-

4982 *Biometrics*, 000 0000

tion

GLM for partially pooled categorical pre

about

4984 *Biometrics*, 000 0000

more

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4986 *Biometrics*, 000 0000

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4988 *Biometrics*, 000 0000

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4990 *Biometrics*, 000 0000

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4992*Biometrics*, 000 0000

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4994 *Biometrics*, 000 0000

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4996*Biometrics*, 000 0000

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4998*Biometrics*, 000 0000

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es-

5000*Biometrics*, 000 0000

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GLM for partially pooled categorical pre

mates

5002*Biometrics*, 000 0000

that

GLM for partially pooled categorical pre

we

5004*Biometrics*, 000 0000

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5006*Biometrics*, 000 0000

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5008*Biometrics*, 000 0000

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5010*Biometrics*, 000 0000

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5012*Biometrics*, 000 0000

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5014 *Biometrics*, 000 0000

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5016*Biometrics*, 000 0000

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[Table 3

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6. Discussion

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5030 *Biometrics*, 000 0000

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5032*Biometrics*, 000 0000

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5034 *Biometrics*, 000 0000

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5036 *Biometrics*, 000 0000

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fects

5038 *Biometrics*, 000 0000

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5040 *Biometrics*, 000 0000

ity

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to

5042*Biometrics*, 000 0000

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5044 *Biometrics*, 000 0000

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risks

5046 *Biometrics*, 000 0000

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5048*Biometrics*, 000 0000

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5050 *Biometrics*, 000 0000

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5058 *Biometrics*, 000 0000

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5060 *Biometrics*, 000 0000

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5062*Biometrics*, 000 0000

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5064 *Biometrics*, 000 0000

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5068*Biometrics*, 000 0000

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5076 *Biometrics*, 000 0000

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5078 *Biometrics*, 000 0000

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5100 *Biometrics*, 000 0000

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5102 *Biometrics*, 000 0000

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5104 *Biometrics*, 000 0000

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5106 *Biometrics*, 000 0000

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5108 *Biometrics*, 000 0000

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5110 *Biometrics*, 000 0000

can

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markedly

5112 *Biometrics*, 000 0000

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5122*Biometrics*, 000 0000

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5126 *Biometrics*, 000 0000

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5128 *Biometrics*, 000 0000

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5130 *Biometrics*, 000 0000

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5132 *Biometrics*, 000 0000

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5134 *Biometrics*, 000 0000

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5142 *Biometrics*, 000 0000

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5144 *Biometrics*, 000 0000

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5166 *Biometrics*, 000 0000

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5176 *Biometrics*, 000 0000

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5178 *Biometrics*, 000 0000

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5180 *Biometrics*, 000 0000

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5182*Biometrics*, 000 0000

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5184 *Biometrics*, 000 0000

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5220 *Biometrics*, 000 0000

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5342*Biometrics*, 000 0000

try

GLM for partially pooled categorical pre

can

5344 *Biometrics*, 000 0000

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5346 *Biometrics*, 000 0000

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GLM for partially pooled categorical pre

used

5348 *Biometrics*, 000 0000

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GLM for partially pooled categorical pre

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5350 *Biometrics*, 000 0000

fine

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the

5352*Biometrics*, 000 0000

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5370 *Biometrics*, 000 0000

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5374 *Biometrics*, 000 0000

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