



PROGRAM STUDI STATISTIKA
SK BAN-PT No. 1765/SK/BAN-PT/AK-PPJ/S/III/2022
FAKULTAS SAINS DAN TEKNOLOGI
UNIVERSITAS PGRI ADI BUANA SURABAYA

FORM F.SK05
BUKTI BIMBINGAN SKRIPSI

Nama Mahasiswa : Abdullah Jabbar Daimuddin
NIM : 192400018
Judul Skripsi : Pemodelan Faktor-Faktor yang Mempengaruhi IPM di
Indonesia Tahun 2021 Menggunakan Regresi Logistik
Ordinal
Dosen Pembimbing : Dra. Wara Pramesti, M.Si

Materi Pembimbingan Proposal	Tanda Tangan Dosen Pembimbing
1. Bimbingan Bab 1, 2, & 3	
2. Revisi Bab 1, 2, & 3	
3. Revisi Bab 2	
4. Bimbingan Bab 4 & 5	
5. Revisi Bab 4 & 5	
6. Revisi Bab 4	
7. Bimbingan Artikel Skripsi	
8. Revisi Artikel Skripsi & uji wald	

Catatan: *) Coret yang tidak sesuai



FORM F.SK08
PERBAIKAN/REVISI SEMINAR DAN UJIAN SKRIPSI

Nama Mahasiswa : Abdullah Jabbar Daimuddin
NIM : 192400018
Judul Skripsi : Pemodelan Faktor-Faktor Yang
Mempengaruhi IPM Di Indonesia Tahun
2021 Menggunakan Regresi Logistik Ordinal
Dosen Pembimbing : Dra. Wara Pramesti, M.Si

Materi Revisi Seminar dan Ujian Skripsi	Tanda Tangan Dosen Penguji
1. Revisi Interpretasi odds ratio	
2. Penambahan model & interpretasi	
3. Revisi Interpretasi odds ratio dengan Penambahan kategori	
4. Pembetulan kesimpulan	
5. Pembetulan saran	
6. Penambahan Perbandingan dengan Penelitian terdahulu	

Surabaya, 20 Juli 2023
Dosen Pembimbing,

Dra. Wara Pramesti, M.Si
NPP : 8705185/DY

Catatan: *) Coret yang tidak sesuai

Lembar ini digunakan untuk bukti perbaikan makalah/jurnal dan hasil ujian skripsi
 Batas waktu revisi proposal dua minggu terhitung dari waktu ujian proposal

LAMPIRAN

Lampiran 1 Data Penelitian

Provinsi	IPM	KAT IPM	X1	X2	X3	X4	X5	X6
Aceh	72.18	2	88,79	83,28	6,3	70,8	1,36	15,53
Sumatera Utara	72.00	2	90,89	78,66	6,33	67,99	1,36	8,49
Sumatera Barat	72.65	2	83,4	84,07	6,52	68,99	2,17	6,04
Riau	72.94	2	89,76	77,81	4,42	64	1,44	7
Jambi	71.63	2	79,7	72,5	5,09	61,56	2,34	7,67
Sumatera Selatan	70.24	2	84,7	71,53	4,98	60,53	2,28	12,79
Bengkulu	71.64	2	67,39	79,75	3,65	66,08	1,88	14,43
Lampung	69.90	1	80,2	71,72	4,69	60,31	1,67	11,67
Kep, Bangka Belitung	71.69	2	73,4	68,15	5,03	58,79	3,52	4,67
Kep, Riau	75.79	2	90,83	84,4	9,91	73,36	0,49	5,75
DKI Jakarta	81.11	3	99,86	72,32	8,5	60,53	2,85	4,67
Jawa Barat	72.45	2	93,24	67,8	9,82	58,58	2,41	7,97
Jawa Tengah	72.16	2	93,62	70,79	5,95	60,46	2,49	11,25
DI Yogyakarta	80.22	3	95,69	89,63	4,56	71,42	4,2	11,91
Jawa Timur	72.14	2	95,02	74,14	5,74	62,63	2,86	10,59
Banten	72.72	2	93,51	68,94	8,98	59,69	2,83	6,5
Bali	75.69	2	97,56	83,96	5,37	74,82	-3,63	4,72
Nusa Tenggara Barat	68.65	1	94,6	77,49	3,01	67,09	0,7	13,83
Nusa Tenggara Timur	65.28	1	85,4	75,77	3,77	54,29	1,02	20,44
Kalimantan Barat	67.90	1	78,76	69,38	5,82	51,77	3,44	6,84
Kalimantan Tengah	71.25	2	77,05	66,7	4,53	54,25	2,09	5,16
Kalimantan Selatan	71.28	2	76,4	69,31	4,95	58,37	1,98	4,56
Kalimantan Timur	76.88	2	85,8	82,01	6,83	69,29	1,15	6,27
Kalimantan Utara	71.19	2	86,8	76,5	4,58	65,37	1,94	6,83
Sulawesi Utara	73.30	2	91,65	73,86	7,06	63,33	3,32	7,36

Sulawesi Tengah	69.79	1	88,51	76,32	3,75	65,44	10,07	12,18
Sulawesi Selatan	72.24	2	91,18	71,21	5,72	60,35	3,66	8,53
Sulawesi Tenggara	71.66	2	91,94	75,02	3,92	63,7	2,44	11,74
Gorontalo	69.00	1	94,57	71,3	3,01	58,21	1,38	15,41
Sulawesi Barat	66.36	1	78,35	71,22	3,13	59,77	1,01	11,85
Maluku	69.71	1	93,21	79,68	6,93	64,71	1,99	16,3
Maluku Utara	68.76	1	88,66	77,01	4,71	64,11	14,99	6,38
Papua Barat	65.26	1	81,68	81,21	5,84	63,51	-2,77	21,82
Papua	60.62	1	64,92	63,98	3,33	44,41	13,46	27,38

Lampiran 2 Hasil Klasifikasi Pemodelan

Kabupaten/Kota	Y	\hat{Y}	π_1	π_2	π_3
Aceh	Tinggi	Tinggi	0,304	0,687	$0,81 \times 10^{-2}$
Sumatera Utara	Tinggi	Tinggi	0,055	0,887	$0,58 \times 10^{-1}$
Sumatera Barat	Tinggi	Tinggi	0,023	0,845	0,132
Riau	Tinggi	Tinggi	0,073	0,883	$0,43 \times 10^{-1}$
Jambi	Tinggi	Tinggi	0,197	0,788	$0,14 \times 10^{-1}$
Sumatera Selatan	Tinggi	Sedang	0,570	0,427	$0,27 \times 10^{-2}$
Bengkulu	Tinggi	Sedang	0,726	0,272	$0,13 \times 10^{-3}$
Lampung	Sedang	Sedang	0,511	0,486	$0,34 \times 10^{-3}$
Kep. Bangka Belitung	Tinggi	Tinggi	0,186	0,799	$0,15 \times 10^{-1}$
Kep.Riau	Tinggi	Tinggi	0,004	0,500	0,496
DKI Jakarta	Sangat Tinggi	Tinggi	0,017	0,812	0,171
Jawa Barat	Tinggi	Tinggi	0,065	0,886	$0,49 \times 10^{-1}$
Jawa Tengah	Tinggi	Tinggi	0,315	0,678	$0,77 \times 10^{-2}$
DI Yogyakarta	Sangat Tinggi	Tinggi	0,136	0,842	$0,22 \times 10^{-1}$
Jawa Timur	Tinggi	Tinggi	0,217	0,770	$0,13 \times 10^{-1}$
Banten	Tinggi	Tinggi	0,048	0,885	$0,67 \times 10^{-1}$
Bali	Tinggi	Sangat Tinggi	0,003	0,462	0,534
Nusa Tenggara Barat	Sedang	Tinggi	0,440	0,556	$0,45 \times 10^{-2}$
Nusa Tenggara Timur	Sedang	Sedang	0,947	0,527	$0,20 \times 10^{-3}$
Kalimantan Barat	Sedang	Tinggi	0,267	0,723	$0,97 \times 10^{-2}$
Kalimantan Tengah	Tinggi	Tinggi	0,215	0,771	$0,13 \times 10^{-1}$
Kalimantan Selatan	Tinggi	Tinggi	0,121	0,853	$0,25 \times 10^{-1}$
Kalimantan Timur	Tinggi	Tinggi	0,020	0,830	0,150
Kalimantan Utara	Tinggi	Tinggi	0,085	0,878	$0,37 \times 10^{-1}$
Sulawesi Utara	Tinggi	Tinggi	0,073	0,883	$0,43 \times 10^{-1}$
Sulawesi Tengah	Sedang	Sedang	0,760	0,239	$0,11 \times 10^{-2}$
Sulawesi Selatan	Tinggi	Tinggi	0,205	0,781	$0,14 \times 10^{-1}$
Sulawesi Tenggara	Tinggi	Tinggi	0,390	0,604	$0,56 \times 10^{-2}$
Gorontalo	Sedang	Sedang	0,781	0,218	$0,10 \times 10^{-2}$
Sulawesi Barat	Sedang	Sedang	0,635	0,363	$0,21 \times 10^{-2}$
Maluku	Sedang	Tinggi	0,432	0,563	$0,47 \times 10^{-2}$
Maluku Utara	Sedang	Tinggi	0,453	0,542	$0,43 \times 10^{-2}$
Papua Barat	Sedang	Sedang	0,806	0,193	$0,86 \times 10^{-3}$
Papua	Sedang	Sedang	0,999	$0,51 \times 10^{-4}$	$0,18 \times 10^{-6}$

Lampiran 3 Output Regresi Logistik Ordinal menggunakan R Studio

```
library(readxl)
library(MASS)
## Warning: package 'MASS' was built under R version 4.2.3
library(ordinal)
## Warning: package 'ordinal' was built under R version 4.2.3
library(pscl)
## Classes and Methods for R developed in the
## Political Science Computational Laboratory
## Department of Political Science
## Stanford University
## Simon Jackman
## hurdle and zeroinfl functions by Achim Zeileis
library(performance)
#Data
ipm=read_excel("E:/DOC ALRA/Dokumen Penting/Skripsi/Data
ipm indo 2021/data ipm indo.xlsx", col_types = c("text","text",
"numeric","numeric","numeric",
"numeric","numeric","numeric","numeric"))
attach(ipm)
str(ipm)
## tibble [34 × 9] (S3: tbl_df/tbl/data.frame)
## $ provinsi : chr [1:34] "ACEH" "SUMATERA UTARA"
"SUMATERA BARAT" "RIAU" ...
## $ status : chr [1:34] "Tinggi" "Tinggi"
```

```

"Tinggi" "Tinggi" ...
## $ IPM      : num [1:34] 2 2 2 2 2 2 2 1 2 2 ...
## $ rumahtangga: num [1:34] 88.8 90.9 83.4 89.8 79.7 ...
## $ APS      : num [1:34] 83.3 78.7 84.1 77.8 72.5 ...
## $ TPT      : num [1:34] 6.3 6.33 6.52 4.42 5.09 4.98 3.65 4.69 5.03
9.91 ...
## $ APM      : num [1:34] 70.8 68 69 64 61.6 ...
## $ PDRB     : num [1:34] 1.36 1.36 2.17 1.44 2.34 2.28 1.88 1.67
3.52 0.49 ...
## $ miskin   : num [1:34] 15.53 8.49 6.04 7 7.67 ...
str(ipm$IPM)
## num [1:34] 2 2 2 2 2 2 2 1 2 2 ...
ipm$'IPM'=factor(ipm$'IPM', levels = c("1","2","3"))
data = data.frame(ipm[,3:9])
data$IPM= as.ordered(data$IPM)
#uji multiko
library(lmtest)
## Loading required package: zoo
##
## Attaching package: 'zoo'
## The following objects are masked from 'package:base':
##   as.Date, as.Date.numeric

```

```
regOLS=lm(rumahtangga~APS+TPT+APM+PDRB+miskin)
```

```
summary(regOLS)
```

```
## Call:
```

```
## lm(formula = rumahtangga ~ APS + TPT + APM + PDRB +  
miskin)
```

```
##
```

```
## Residuals:
```

```
##   Min     1Q  Median     3Q    Max
```

```
## -18.7963 -5.2810  0.9448  4.8777 13.1146
```

```
##
```

```
## Coefficients:
```

```
##           Estimate Std. Error t value Pr(>|t|)
```

```
## (Intercept) 49.47840  18.16331  2.724  0.011 *
```

```
## APS         -0.41573   0.54997 -0.756  0.456
```

```
## TPT          1.33764   0.79811  1.676  0.105
```

```
## APM          0.95610   0.56888  1.681  0.104
```

```
## PDRB         -0.02327   0.39483 -0.059  0.953
```

```
## miskin       0.12782   0.32714  0.391  0.699
```

```
## ---
```

```
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
##
```

```
## Residual standard error: 7.484 on 28 degrees of freedom
```

```
## Multiple R-squared:  0.3362, Adjusted R-squared:  0.2176
```

```
## F-statistic: 2.836 on 5 and 28 DF, p-value: 0.03406
```



```
regOLS1=lm(APS~rumahtangga+TPT+APM+PDRB+miskin)
```

```
summary(regOLS1)
```

```
## Call:
```

```
## lm(formula = APS ~ rumahtangga + TPT + APM + PDRB +  
miskin)
```

```
##
```

```
## Residuals:
```

```
##   Min     1Q  Median     3Q    Max
```

```
## -2.6302 -1.8002 -0.7645  1.2148  5.8130
```

```
##
```

```
## Coefficients:
```

```
##           Estimate Std. Error t value Pr(>|t|)
```

```
## (Intercept) 15.02054   6.34303   2.368 0.02502 *
```

```
## rumahtangga -0.04811   0.06364  -0.756 0.45602
```

```
## TPT          0.04225   0.28467   0.148 0.88307
```

```
## APM          0.96857   0.08787  11.023 1.07e-11 ***
```

```
## PDRB         0.03345   0.13417   0.249 0.80493
```

```
## miskin       0.32671   0.09295   3.515 0.00152 **
```

```
## ---
```

```
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
##
```

```
## Residual standard error: 2.546 on 28 degrees of freedom
```

```
## Multiple R-squared:  0.8473, Adjusted R-squared:  0.82
```

```
## F-statistic: 31.07 on 5 and 28 DF, p-value: 1.334e-10
```

```
regOLS2=lm(TPT~rumahtangga+APS+APM+PDRB+miskin)
```

```
summary(regOLS2)
```

```
## Call:
```

```
## lm(formula = TPT ~ rumahtangga + APS + APM + PDRB +  
miskin)
```

```
##
```

```
## Residuals:
```

```
##   Min     1Q  Median     3Q    Max
```

```
## -2.5941 -1.1914 -0.2426  0.9388  3.6834
```

```
##
```

```
## Coefficients:
```

```
##           Estimate Std. Error t value Pr(>|t|)
```

```
## (Intercept)  1.85725   4.59812   0.404  0.6893
```

```
## rumahtangga  0.06816   0.04067   1.676  0.1049
```

```
## APS          0.01861   0.12536   0.148  0.8831
```

```
## APM         -0.03651   0.13456  -0.271  0.7882
```

```
## PDRB        -0.04905   0.08865  -0.553  0.5844
```

```
## miskin     -0.11999   0.07049  -1.702  0.0998 .
```

```
## ---
```

```
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
##
```

```
## Residual standard error: 1.689 on 28 degrees of freedom
```

```
## Multiple R-squared:  0.2679, Adjusted R-squared:  0.1372
```

```
## F-statistic:  2.05 on 5 and 28 DF,  p-value: 0.1021
```

regOLS3=lm(APM~rumahtangga+APS+TPT+PDRB+miskin)

summary(regOLS3)

Call:

**## lm(formula = APM ~ rumahtangga + APS + TPT + PDRB +
miskin)**

##

Residuals:

Min 1Q Median 3Q Max

-6.2125 -0.5632 0.4869 1.3610 2.9917

##

Coefficients:

Estimate Std. Error t value Pr(>|t|)

(Intercept) -4.80927 6.40387 -0.751 0.458922

rumahtangga 0.09584 0.05703 1.681 0.103951

APS 0.83908 0.07612 11.023 1.07e-11 ***

TPT -0.07182 0.26472 -0.271 0.788156

PDRB -0.11316 0.12317 -0.919 0.366114

miskin -0.31654 0.08490 -3.728 0.000866 ***

---

Signif. codes: 0 '*' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1**

##

Residual standard error: 2.369 on 28 degrees of freedom

Multiple R-squared: 0.8772, Adjusted R-squared: 0.8552

F-statistic: 39.99 on 5 and 28 DF, p-value: 6.64e-12

```

library(lmtest)

regOLS4=lm(PDRB~rumahtangga+APS+TPT+APM+miskin)

summary(regOLS4)

## Call:

## lm(formula = PDRB ~ rumahtangga + APS + TPT + APM +
miskin)

##

## Residuals:

##   Min     1Q   Median     3Q    Max

## -5.3625 -1.6057 -0.2442  0.4735 12.2178

## Coefficients:

##           Estimate Std. Error t value Pr(>|t|)

## (Intercept) 15.926729   9.302703   1.712  0.0979 .

## rumahtangga -0.005331   0.090444  -0.059  0.9534

## APS          0.066221   0.265602   0.249  0.8049

## TPT         -0.220505   0.398516  -0.553  0.5844

## APM         -0.258576   0.281467  -0.919  0.3661

## miskin      -0.025971   0.156921  -0.166  0.8697

## ---

## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

##

## Residual standard error: 3.582 on 28 degrees of freedom

## Multiple R-squared:  0.153, Adjusted R-squared:  0.001797

## F-statistic: 1.012 on 5 and 28 DF, p-value: 0.4293

```

regOLS5=lm(miskin~rumahtangga+APS+TPT+APM+PDRB)

summary(regOLS5)

Call:

lm(formula = miskin ~ rumahtangga + APS + TPT + APM + PDRB)

##

Residuals:

Min 1Q Median 3Q Max

-8.8531 -2.8370 0.7733 2.6905 8.0516

##

Coefficients:

Estimate Std. Error t value Pr(>|t|)

(Intercept) 6.27102 11.70962 0.536 0.596502

rumahtangga 0.04242 0.10858 0.391 0.698967

APS 0.93713 0.26660 3.515 0.001516 **

TPT -0.78159 0.45915 -1.702 0.099786 .

APM -1.04808 0.28111 -3.728 0.000866 ***

PDRB -0.03763 0.22737 -0.166 0.869735

---

Signif. codes: 0 '*' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1**

##

Residual standard error: 4.312 on 28 degrees of freedom

Multiple R-squared: 0.4614, Adjusted R-squared: 0.3652

F-statistic: 4.798 on 5 and 28 DF, p-value: 0.002719

```

#estimasi paramater model ordinal

model <-
polr(IPM~rumahtangga+APS+TPT+APM+PDRB+miskin, data =
data, Hess=TRUE)

## Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

summary(model)

## Call:
## polr(formula = IPM ~ rumahtangga + APS + TPT + APM +
PDRB + miskin,
## data = data, Hess = TRUE)
##
## Coefficients:
##          Value Std. Error t value
## rumahtangga 0.04077  0.06484  0.6288
## APS          0.07911  0.22541  0.3510
## TPT          0.27952  0.28961  0.9652
## APM          0.03970  0.22303  0.1780
## PDRB        -0.18761  0.13746 -1.3648
## miskin      -0.34209  0.14349 -2.3841
##
## Intercepts:
##          Value Std. Error t value
## 1|2  8.3863  8.1049  1.0347
## 2|3 14.0191  8.7932  1.5943

```

```

##
## Residual Deviance: 37.25381
## AIC: 53.25381
##uji serentak
library(psc1)
pR2(model)
## fitting null model for pseudo-r2
##      llh  llhNull      G2  McFadden   r2ML   r2CU
## -18.6269047 -28.1981443 19.1424793 0.3394280 0.4305100
0.5317457
qchisq(0.95,6)
## [1] 12.59159
library(performance)
model_performance(model,metrics = "all")
## Can't calculate log-loss.
## Can't calculate proper scoring rules for ordinal, multinomial or
cumulative link models.
## # Indices of model performance
##
## AIC | AICc | BIC | Nagelkerke's R2 | RMSE | Sigma
## -----
## 53.254 | 59.014 | 65.465 | 0.532 | 1.545 | 1.153
##uji wald % p-value (parsial)
(ctable <- coef(summary(model)))

```

```

##           Value Std. Error  t value
## rumahtangga 0.04076790 0.06483618 0.6287831
## APS         0.07911139 0.22540662 0.3509719
## TPT         0.27951976 0.28960536 0.9651747
## APM         0.03969726 0.22302590 0.1779940
## PDRB        -0.18761372 0.13746436 -1.3648172
## miskin      -0.34209343 0.14349148 -2.3840679
## 1|2         8.38625651 8.10489497 1.0347150
## 2|3         14.01914061 8.79319604 1.5943168
p <- pnorm(abs(ctable[, "t value"]), lower.tail = FALSE) * 2
(ctable <- cbind(ctable, "p value" = p))
##           Value Std. Error  t value  p value
## rumahtangga 0.04076790 0.06483618 0.6287831 0.52949107
## APS         0.07911139 0.22540662 0.3509719 0.72560942
## TPT         0.27951976 0.28960536 0.9651747 0.33445733
## APM         0.03969726 0.22302590 0.1779940 0.85872772
## PDRB        -0.18761372 0.13746436 -1.3648172 0.17231052
## miskin      -0.34209343 0.14349148 -2.3840679 0.01712244
## 1|2         8.38625651 8.10489497 1.0347150 0.30080202
## 2|3         14.01914061 8.79319604 1.5943168 0.11086509
##uji kesusaian model
model[3]
## $deviance

```



```

## [1] 37.25381
qchisq(0.95, 33)
## [1] 47.39988
##odds ratio
exp(coef(model))
##  rumahtangga      APS      TPT      APM      PDRB      miskin
##  1.0416103  1.0823249  1.3224945  1.0404957  0.8289348
0.7102818
##klasifikasi tabel
library(caret)
## Loading required package: ggplot2
## Loading required package: lattice
pred=predict(model, data)
pred
## [1] 2 2 2 2 2 1 1 1 2 2 2 2 2 2 2 2 3 2 1 2 2 2 2 2 2 1 2 2 1 1 2 2 1 1
## Levels: 1 2 3
prob=predict(model, data, type = "prob")
prob
##          1          2          3
## 1 0.304576849 6.873194e-01 8.103787e-03
## 2 0.054635379 8.870597e-01 5.830492e-02
## 3 0.022921359 8.447341e-01 1.323445e-01
## 4 0.073100365 8.834974e-01 4.340223e-02
## 5 0.197472410 7.881941e-01 1.433353e-02

```

6 0.570190422 4.271196e-01 2.690022e-03
7 0.726205246 2.724475e-01 1.347255e-03
8 0.510812713 4.857722e-01 3.415052e-03
9 0.185524327 7.990097e-01 1.546598e-02
10 0.003622516 5.003591e-01 4.960184e-01
11 0.017078992 8.121545e-01 1.707665e-01
12 0.064742094 8.861076e-01 4.915029e-02
13 0.314695136 6.775729e-01 7.732008e-03
14 0.135514476 8.421683e-01 2.231719e-02
15 0.216841883 7.703996e-01 1.275849e-02
16 0.047202659 8.854351e-01 6.736225e-02
17 0.003107640 4.624731e-01 5.344193e-01
18 0.439574128 5.558846e-01 4.541286e-03
19 0.947110431 5.268979e-02 1.997801e-04
20 0.266981095 7.232901e-01 9.728779e-03
21 0.215155224 7.719602e-01 1.288455e-02
22 0.121217346 8.534976e-01 2.528505e-02
23 0.019867233 8.300903e-01 1.500425e-01
24 0.084775681 8.780310e-01 3.719331e-02
25 0.073098408 8.834982e-01 4.340343e-02
26 0.759527075 2.393413e-01 1.131620e-03
27 0.205161349 7.811653e-01 1.367331e-02
28 0.389988748 6.044454e-01 5.565848e-03

```

## 29 0.780507899 2.184869e-01 1.005251e-03
## 30 0.634940979 3.630059e-01 2.053084e-03
## 31 0.431993412 5.633238e-01 4.682818e-03
## 32 0.453326880 5.423766e-01 4.296510e-03
## 33 0.805795524 1.933428e-01 8.616473e-04
## 34 0.999948614 5.120177e-05 1.838796e-07
confusionMatrix(as.factor(pred),data$IPM)
## Confusion Matrix and Statistics
##
##      Reference
## Prediction  1  2  3
##      1  7  2  0
##      2  4 18  2
##      3  0  1  0
##
## Overall Statistics
##
##      Accuracy : 0.7353
##      95% CI : (0.5564, 0.8712)
##      No Information Rate : 0.6176
##      P-Value [Acc > NIR] : 0.1066
##
##      Kappa : 0.4446

```

```

## McNemar's Test P-Value : NA
##
## Statistics by Class:
##
##           Class: 1 Class: 2 Class: 3
## Sensitivity      0.6364  0.8571  0.00000
## Specificity      0.9130  0.5385  0.96875
## Pos Pred Value   0.7778  0.7500  0.00000
## Neg Pred Value   0.8400  0.7000  0.93939
## Prevalence       0.3235  0.6176  0.05882
## Detection Rate   0.2059  0.5294  0.00000
## Detection Prevalence 0.2647  0.7059  0.02941
## Balanced Accuracy 0.7747  0.6978  0.48438

```