

MODEL KALIBRASI: SOLUSI STATISTIKA UNTUK PENDUGAAN YANG EFISIEN



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SEMINAR ON-LINE
23 Januari 2021





Departemen Statistika
Fakultas Matematika dan Ilmu Pengetahuan Alam
IPB University

PROGRAM STUDI SARJANA, MAGISTER, DOKTOR
STATISTIKA DAN SAINS DATA

FREE FOR EVERYONE

SEMINAR ONLINE
CALIBRATION MODEL
AND
RECOMMENDATION SYSTEM



Dr. Erfiani, M.Si
Dosen Departemen Statistika

Model Kalibrasi:
Solusi Statistika untuk
Pendugaan yang Efisien



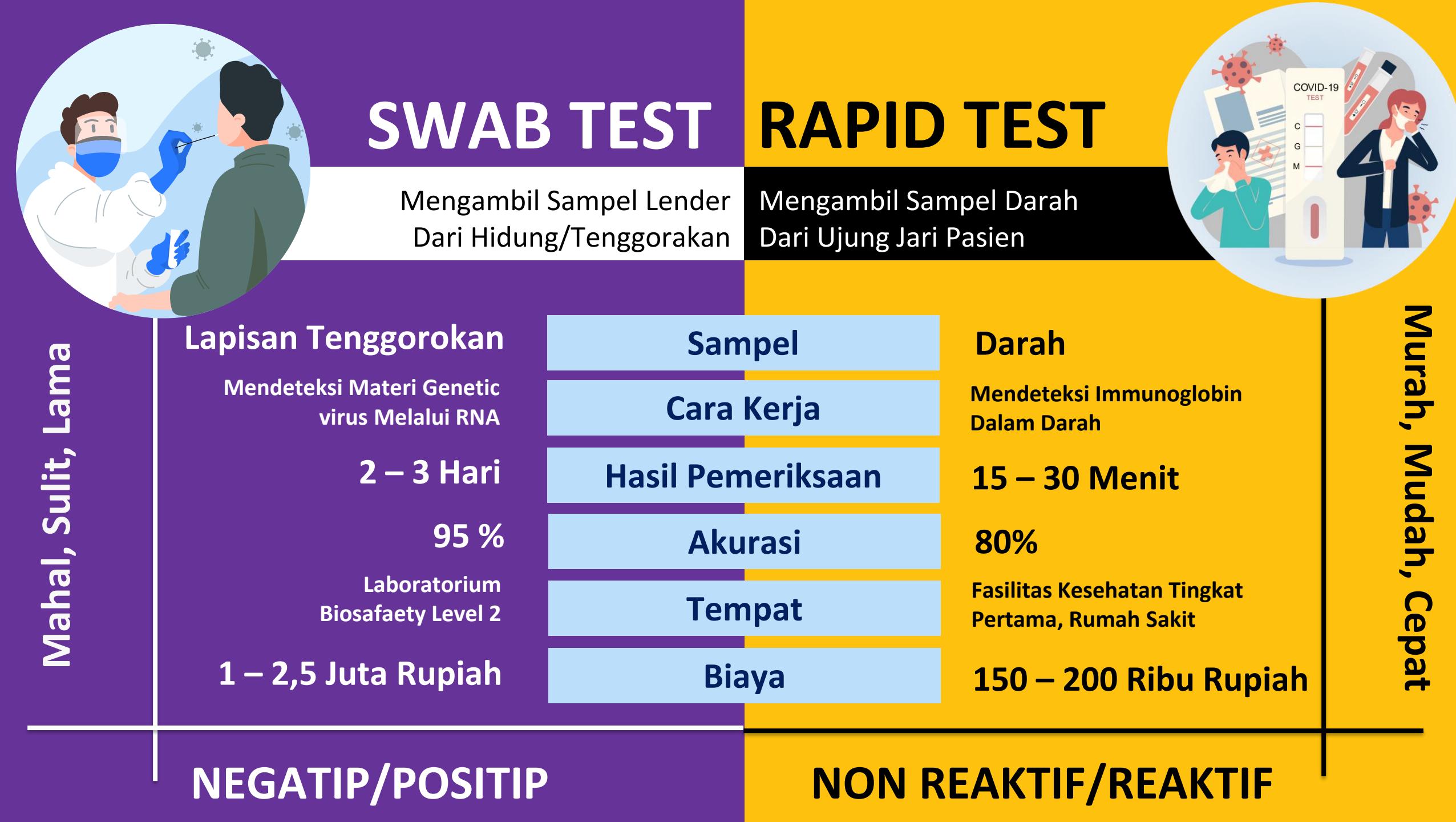
Dian Ayuningtyas, S.Stat
Data Scientist Tokopedia

25%

Pengantar Sistem Rekomendasi
Menggunakan BERT4Rec

MODEL KALIBRASI





SWAB TEST



RAPID TEST



MODEL KALIBRASI

Fungsi yang memetakan keluaran dua alat
(DUA PROSES PENGUKURAN)

Mahal, Sulit, Lama

Y

Murah, Mudah, Cepat

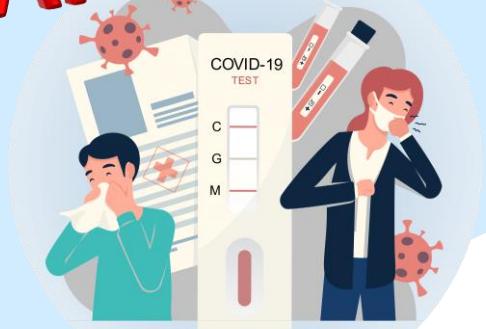
X₁, X₂, … , X_p

$$Y = f(X_1, X_2, \dots, X_p)$$



Bila Model Kalibrasi $Y = f(X_1, X_2, \dots, X_p)$ diketahui

RAPID TEST



X_1, X_2, \dots, X_p



$Y = f(X_1, X_2, \dots, X_p)$



NEGATIP/POSITIP

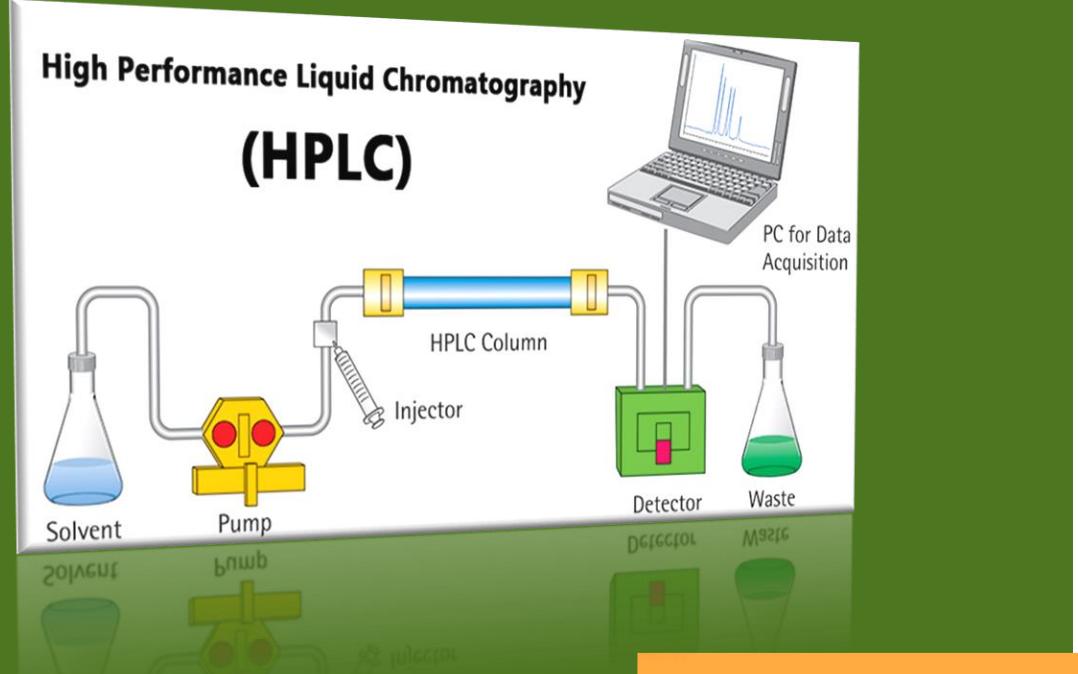


Y -duga



2003-2005

PENDUGAAN KANDUNGAN SENYAWA BIOAKTIF ATAU
SENYAWA PENCIRI BEBERAPA TANAMAN OBAT.



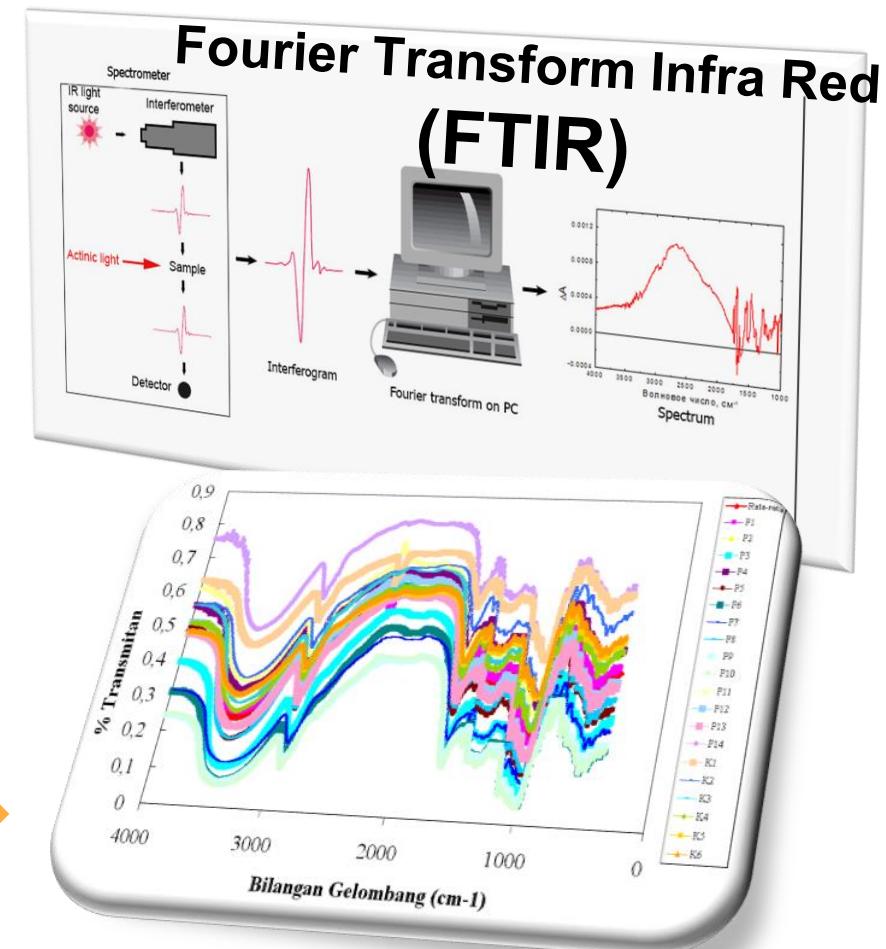
Konsentrasi (Y)

$$\text{Model Kalibrasi} \\ Y = f(X_1, X_2, \dots, X_p)$$

Mahal, Sulit, Lama

2008-2010

PENGEMBANGAN MODEL KALIBRASI MULTIRESPON DAN TEKNIK ADULTERASI OBAT BAHAN ALAM



X_1, X_2, \dots, X_p

Murah, Mudah, Cepat

Metode Invasif

Kadar Gula Darah (Y)



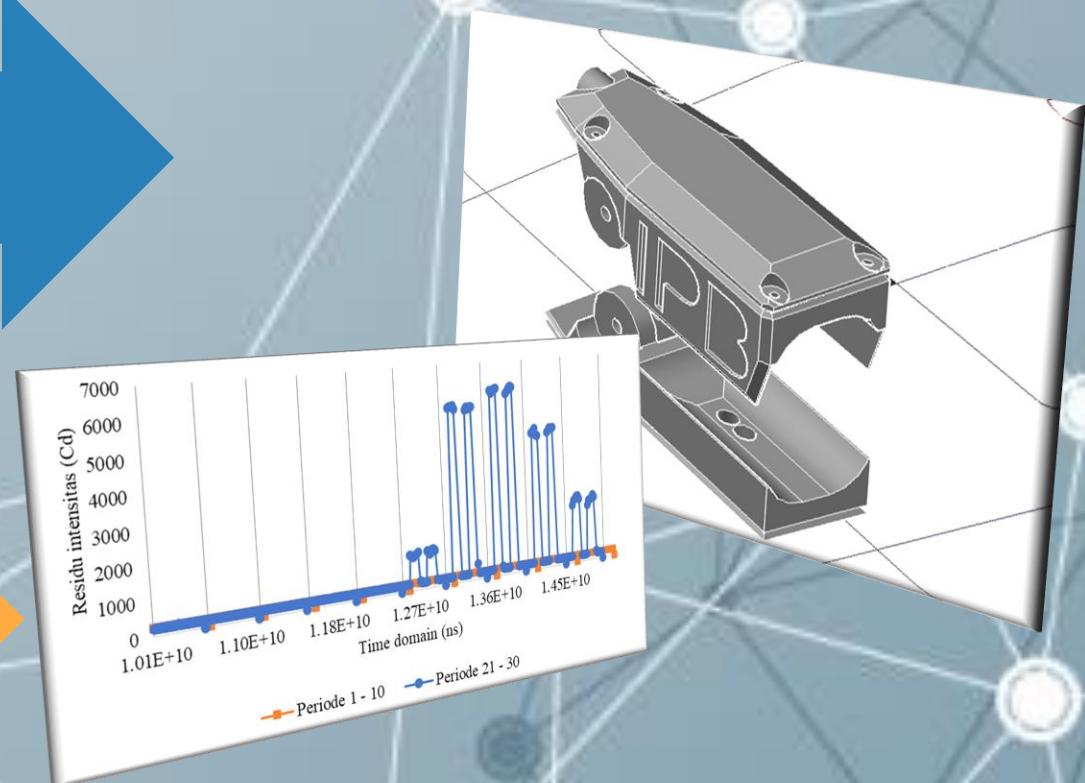
2018-2020 (2021)

Model Kalibrasi
 $Y = f(X_1, X_2, \dots, X_p)$

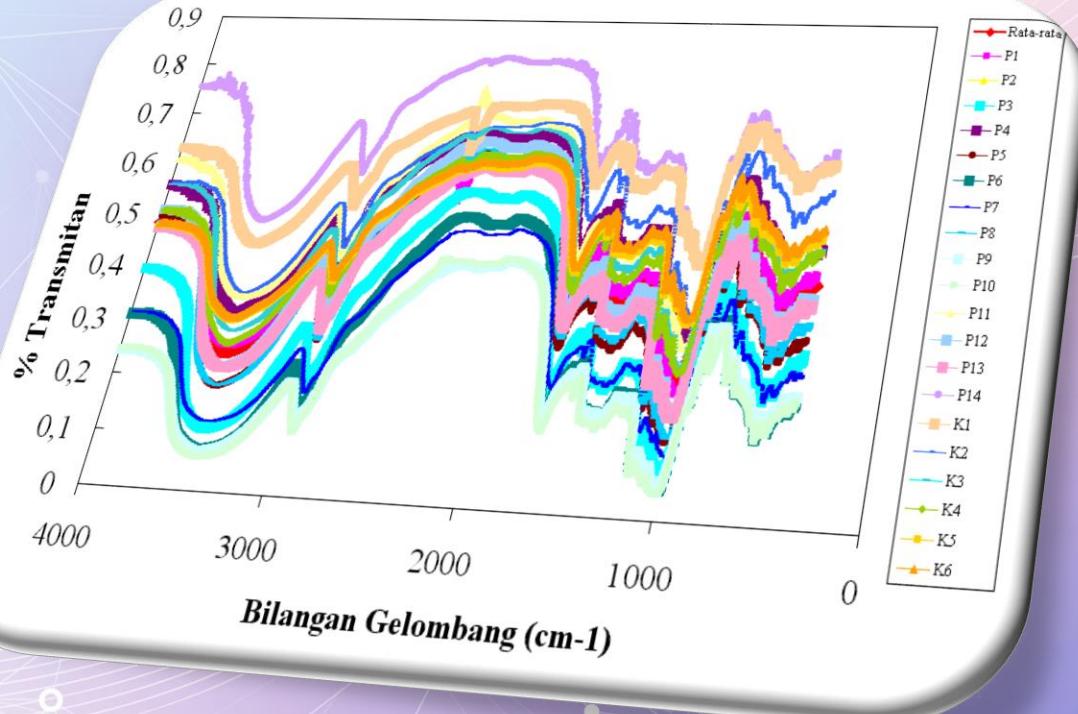
Menimbulkan ketidaknyamanan karena melukai

Pengembangan Sistem Alat Pemantau Pasien Penderita Kadar Gula Darah Tinggi secara *Non-invasive*

Metode Non-Invasif



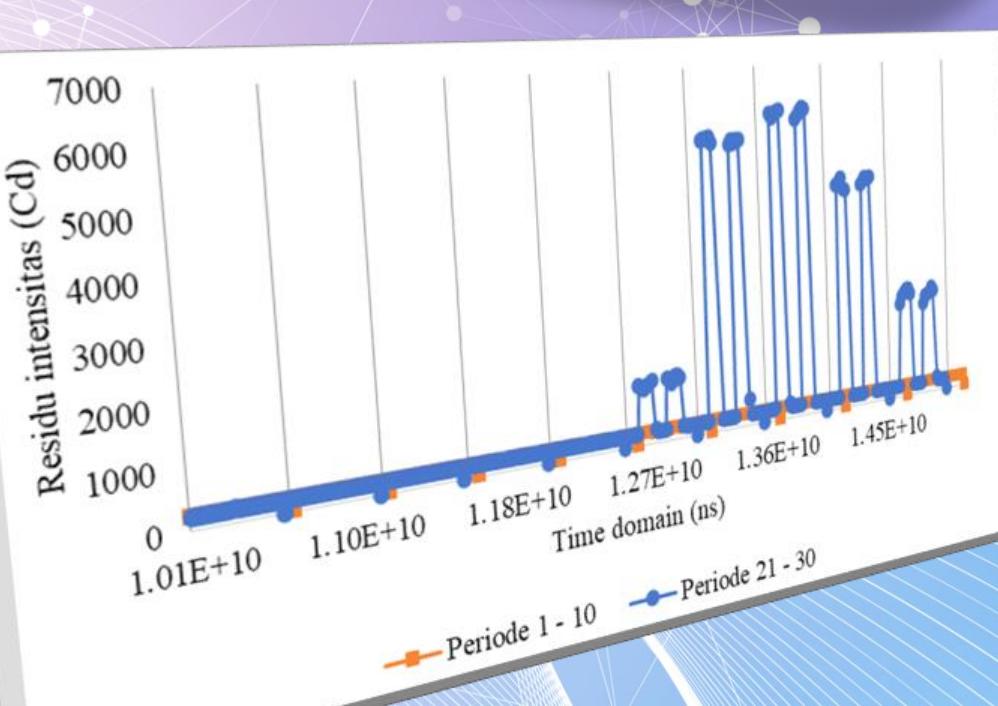
X_1, X_2, \dots, X_p



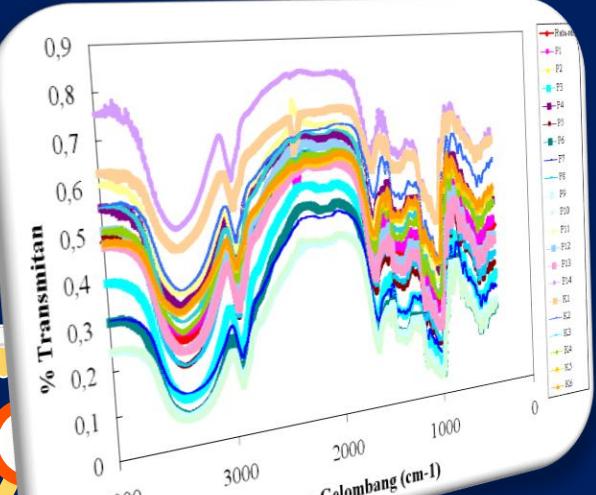
Koreksi Pencaran (Scatter Correction)

Metode Koreksi Pencaran (Scatter Correction)

1. *Multiplicative Scatter Correction (MSC)*
2. *Standard Normal Variate (SNV)*
3. *Orthogonal Scatter Correction (OSC)*
4. *Smoothing Spline*

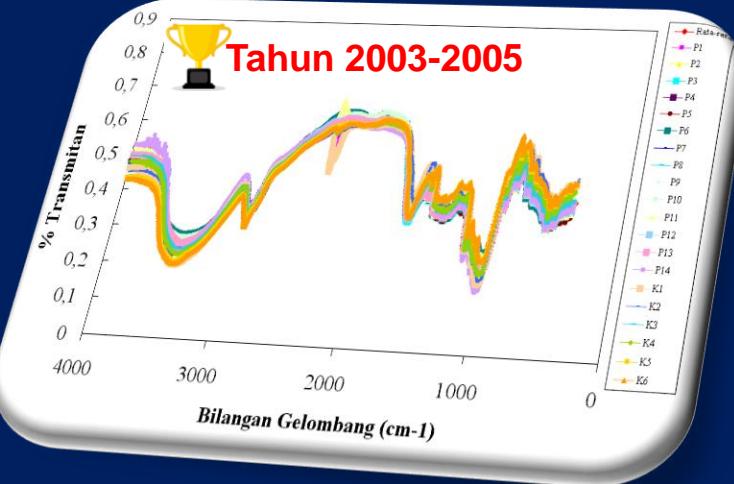


Metode Koreksi Pencaran (*Scatter Correction*)



Multiplicative Scatter Correction (MSC)

$$x_{ij, \text{MSC}} = \frac{(x_{ij} - \hat{\beta}_{0j})}{\hat{\beta}_{1j}}$$

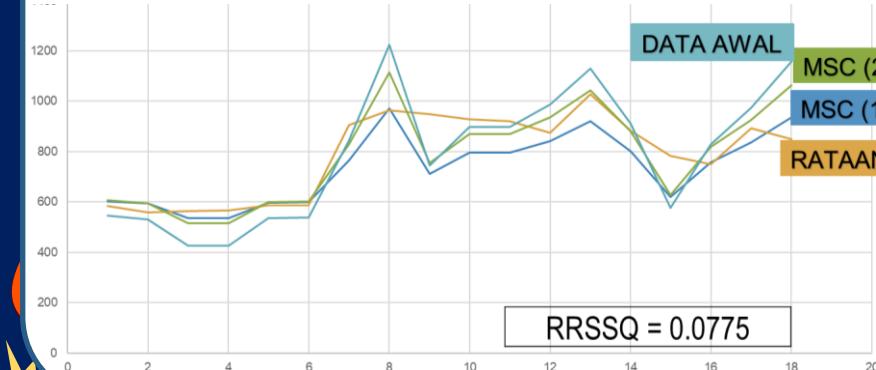


Orthogonal Signal Correction (OSC)

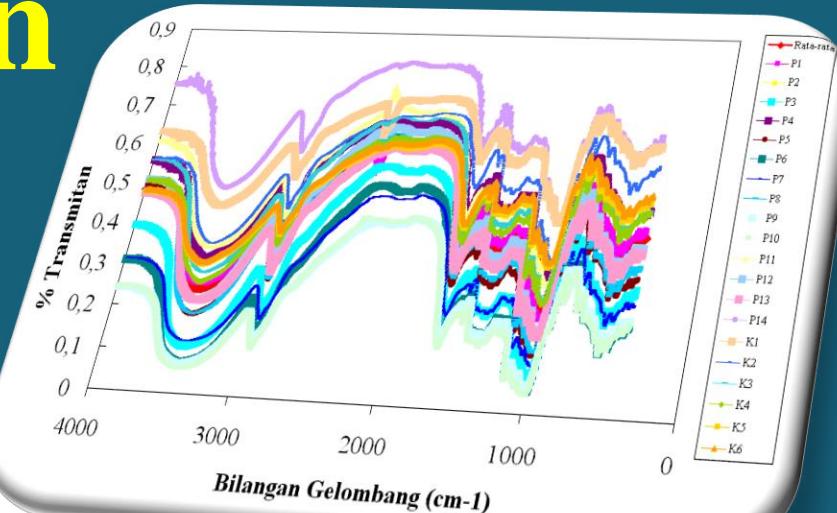
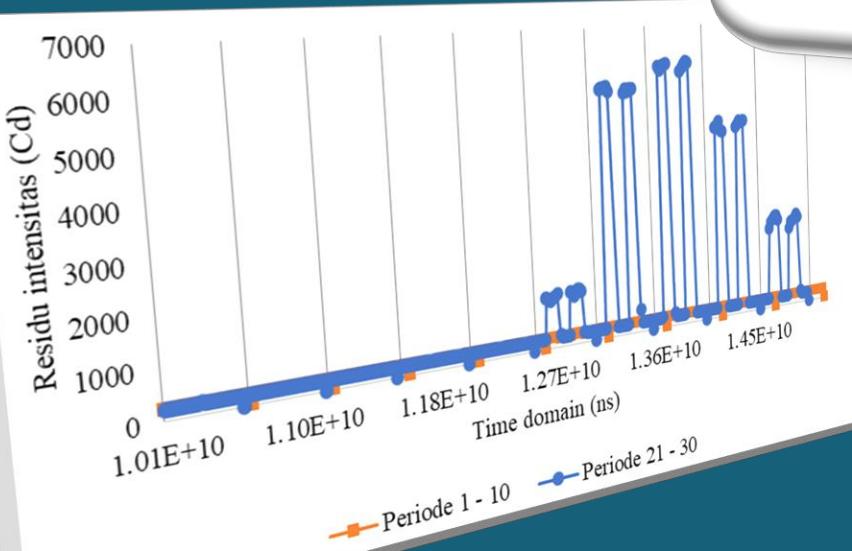
Loopy OSC

Loopy (MSC)

Tahun 2018-2021



Peringkasan Data

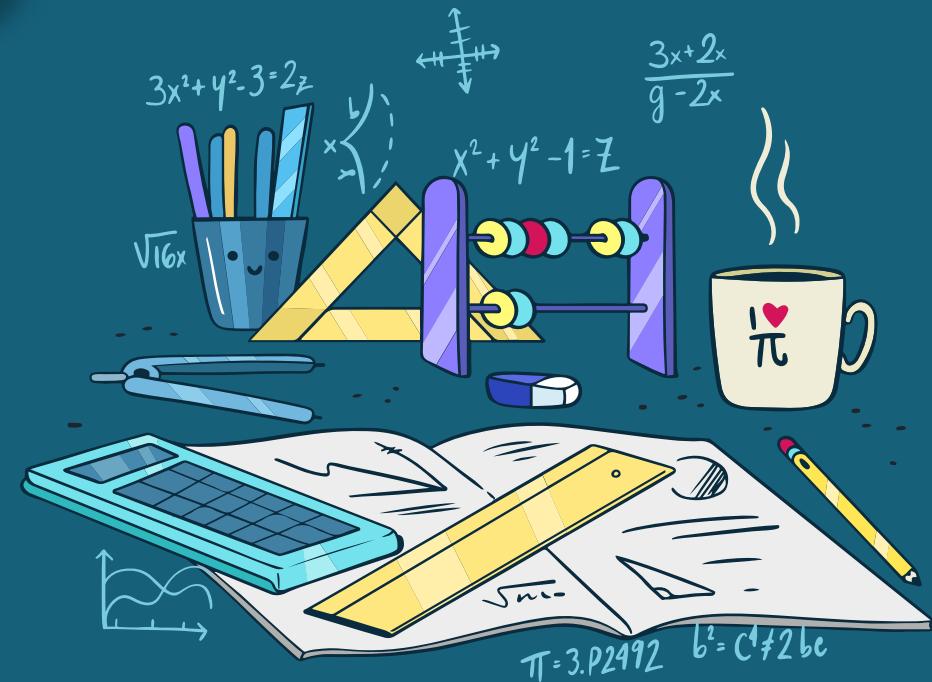


Metode Peringkasan Data

1. Rataan
2. Simpangan Baku
3. Rataan/Simpangan Baku
4. Ringkasan Tiga Angka
5. Ringkasan Lima Angka
6. Pendekatan Luas
7. dll

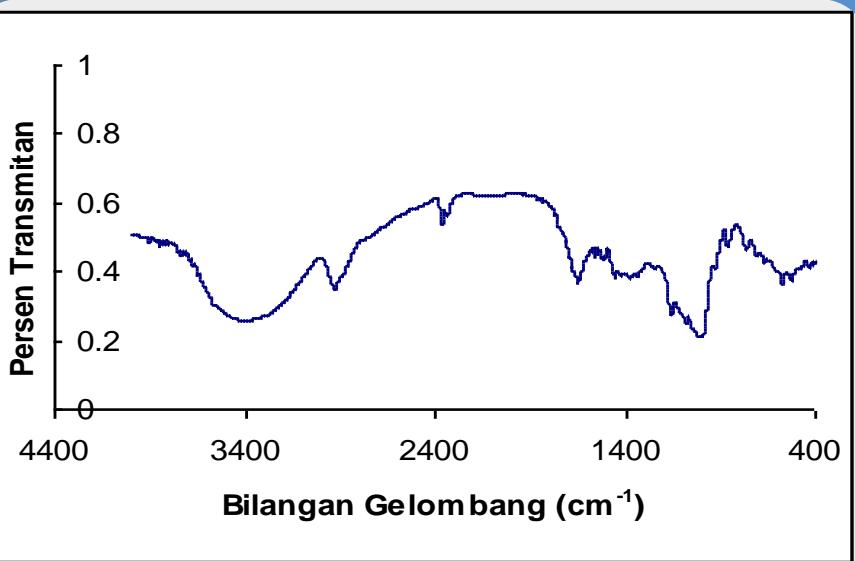
Metode Peringkasan Data

1. Regresi Terpenggal (*Segmented Regression*)
2. Transformasi wavelet
3. Loncatan data
4. Rataan, Simpangan baku,
5. dll



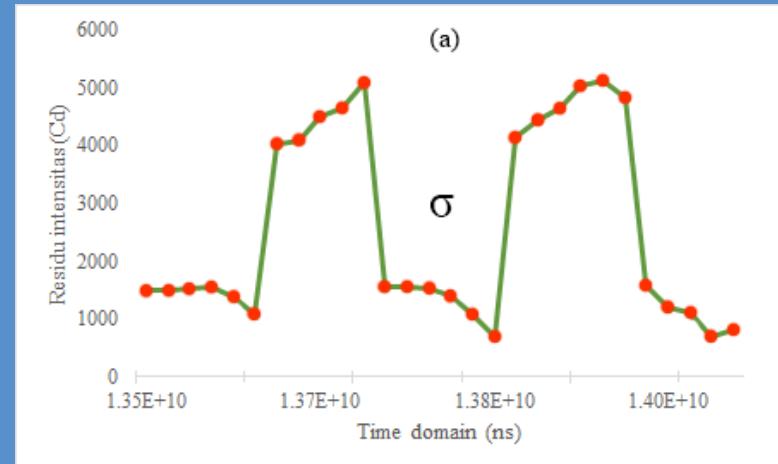
METODE PERINGKASAN DATA

Metode Peringkasan Data



Segmented Regression

Transformasi Wavelet



1. Rataan
2. Simpangan Baku
3. Rataan/Simpangan Baku
4. Ringkasan Tiga Angka
5. Ringkasan Lima Angka
6. Pendekatan Luas

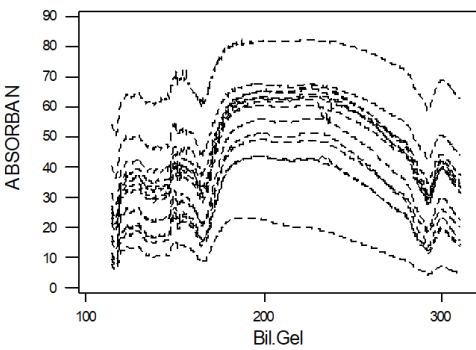
Pendekatan Luas

Tahun 2018-2021

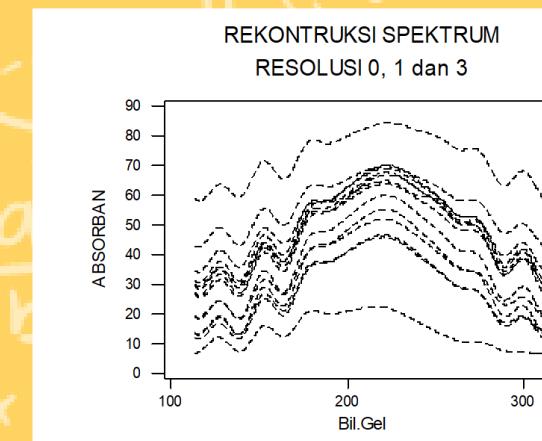
METODE PERINGKASAN DATA

Tahun 2003-2005

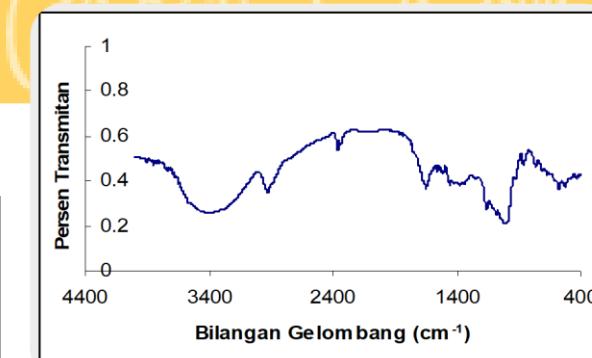
Transformasi Wavelet



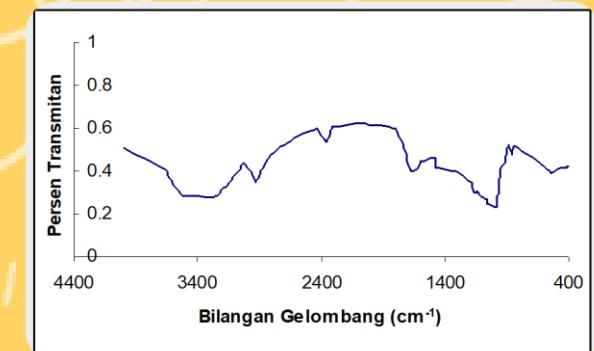
Spektrum absorban untuk 1024 titik



Spektrum rekonstruksi ulang DWT dengan 11 koefisien

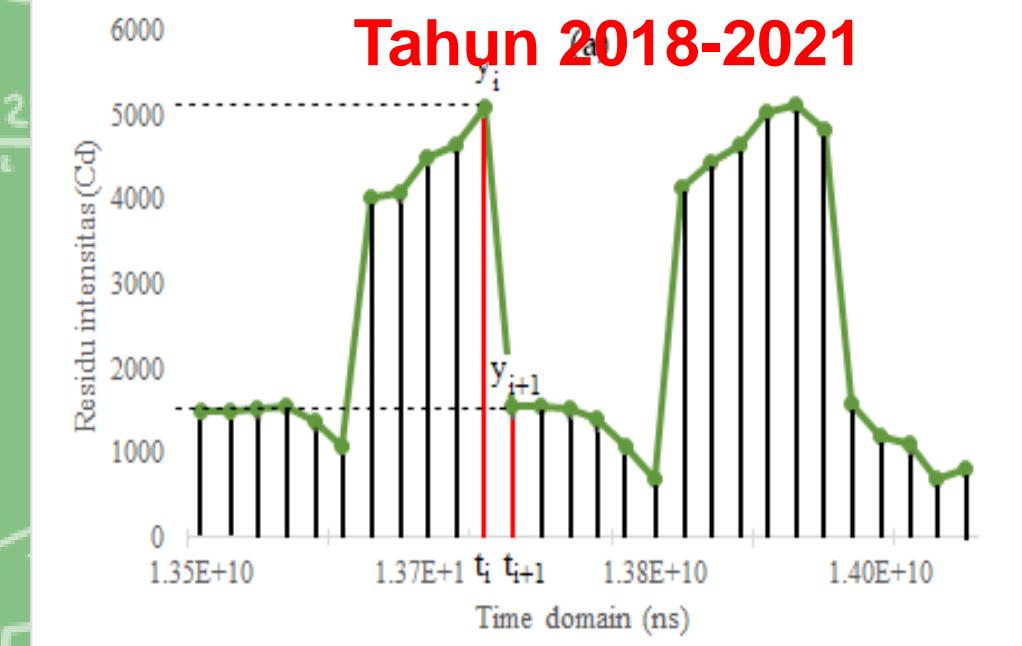
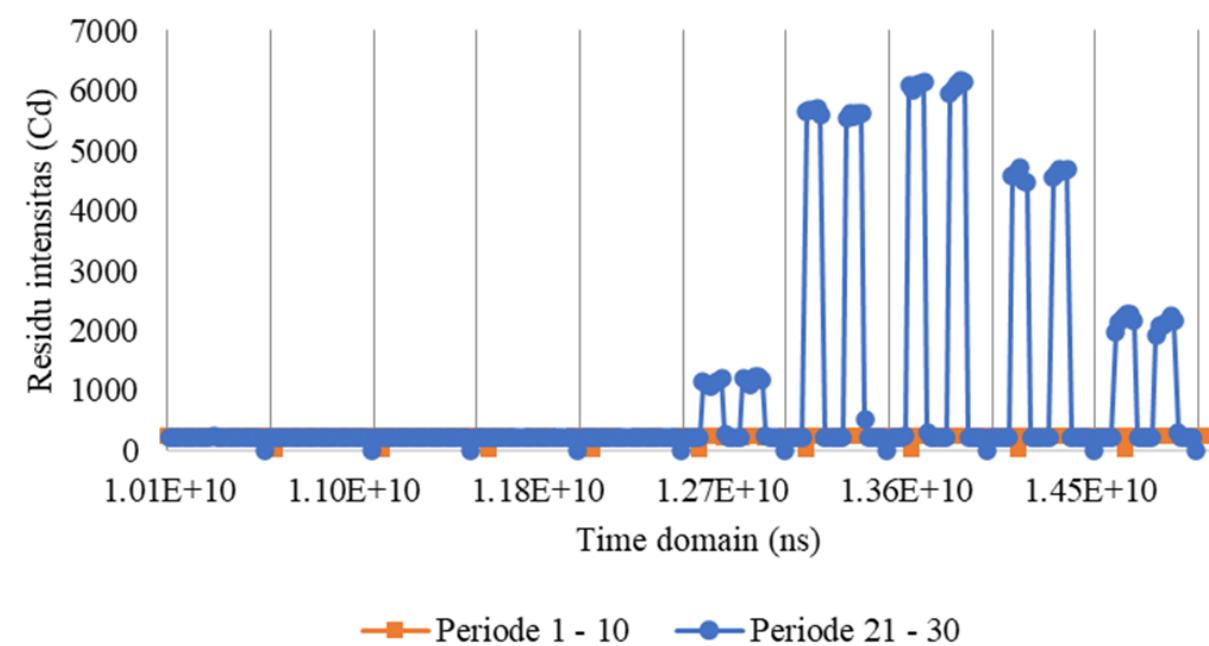


Spektrum serbuk Gingerol sebelum reduksi data 1866 titik



Spektrum serbuk Gingerol setelah reduksi data 86 titik

METODE PERINGKASAN DATA



Pendekatan Luas

PEMODELAN

Tahun 2003-2005

Tahun 2008-2010

Model Kalibrasi

1. Regresi Bayes
2. Regresi Wavelet
3. Regresi Kontinum
4. dll

Tahun 2018-2021

Model Kalibrasi

1. Jaringan Syaraf Tiruan (*artificial neural networks*)
2. Regresi Komponen Utama (*Principal Component Regression*)
3. Regresi Spline (*Spline Regression*)
4. Algoritma Detect Deviating Cell (DDC)
5. Regresi Least Absolute Shrinkage and Selection Operator (LASSO)
6. Regresi Kuadrat Terkecil Parsial
7. Regresi Ridge Robust
8. Regresi Kuantil

2016

2017

2018

2019

2020

2021



Dewi P



Tara



Gita



Ana



Mia



Esti



Windi



Raudhoh



Renan



Ria



Rosni



Selvi



Umam



Dwi



Rosi



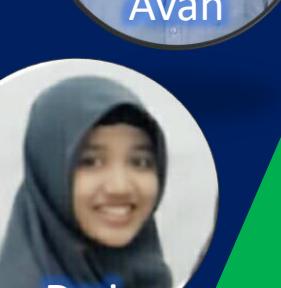
Yesi



Azis



Avan



Linda



Astra



Anti



Dhilla



Shely



Kania



Dahlia



Arif



Via



Ismah



Agung



Yuli



Yuniar

NOW



Fariz



Fathan

REKAM PERISTIWA



Tahun
2018-2019

POTENSI PENGEMBANGAN



NOW



Gula Darah
Oksigen Darah
Hemoglobin



VS



Rapid Test



Next...?

Terima Kasih



Dr. Ir. Erfiani, M.Si

BOLZIN
GRACIAS
ARIGATO
SHUKURIA
MERCI