L A M P I R A N

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Lampiran I

Data Perhitungan Resistivitas Semu Melalui Exchel

Metode *Schlumberger*

Perhitungan ρs Tabel 4.6.

Jarak	$\overline{\rho_s}$ (ohm meter)
1	3,698
2	9,757
3	17,864
4	43,611
5	77,236

Perhitungan ρs Tabel 4.7.

Jarak	$\overline{\rho_s}$ (ohm meter)
1	4,857
2	6,677
3	8,739
4	10,897
5	19,118

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Perhitungan ρs Tabel 4.8.

Jarak	$\overline{\rho_s}$ (ohm meter)
1	6,087
2	16,033
3	62,524
4	66,240
5	69,012

Perhitungan ρs Tabel 4.9.

Jarak	$\overline{\rho_s}$ (ohm meter)
1	9,745
2	21,992
3	50,780
4	101,892
5	156,924

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Lampiran II

Hasil Pembuatan Program RES dengan *Delphi*

```
unit Utama;
interface
uses
  pps,
  filectrl,
  SysUtils, WinTypes, WinProcs, Messages, Classes, Graphics, Controls,
  Forms, Dialogs, TabNotBk, ExtCtrls, StdCtrls, Buttons, Mask, Menus;
type
  Tfrm = class(TForm)
    tbn: TTabbedNotebook;
    tb_Test: TBitBtn;
    tmr_Test: TTimer;
    Label1: TLabel;
    txt_HasilTest: TLabel;
    tb_Keluar: TBitBtn;
    tmr_PCL: TTimer;
    Label2: TLabel;
    Label3: TLabel;
    Label4: TLabel;
    Label5: TLabel;
    Label6: TLabel;
    tb_Setup: TBitBtn;
    Label7: TLabel;
    ed_DirektoriKerja: TEdit;
    sb_DirektoriKerja: TSpeedButton;
    ed_PortMasukan: TEdit;
    ed_PortKeluaran: TEdit;
    ed_Resistor: TEdit;
    ed_Skala: TEdit;
    ed_Gain: TEdit;
    ed_WaktuTunda: TEdit;
    ed_NamaFile: TEdit;
    Label8: TLabel;
    tb_StartPCL: TBitBtn;
    pnl_Hasil: TPanel;
    ch1: TLabel;
    ch2: TLabel;
    ch3: TLabel;
    ch4: TLabel;
    ch5: TLabel;
    ch6: TLabel;
    ch7: TLabel;
    ch8: TLabel;
    ch9: TLabel;
    ch10: TLabel;
    ch11: TLabel;
    ch12: TLabel;
    ch13: TLabel;
    ch14: TLabel;
    ch15: TLabel;
```

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```
    ch16: TLabel;
    Bevel1: TBevel;
    Bevel2: TBevel;
    txt_PortMasukan: TLabel;
    txt_PortKeluaran: TLabel;
    txt_Skala: TLabel;
    txt_Gain: TLabel;
    txt_WaktuTunda: TLabel;
    txt_Putar: TLabel;
    tb_Simpan: TBitBtn;
    ed_Keterangan: TEdit;
    pm: TPopupMenu;
    pm_Konfigurasi: TMenuItem;
    pm_Test: TMenuItem;
    pm_Keluar: TMenuItem;
    procedure FormCreate(Sender: TObject);
    procedure tb_TestClick(Sender: TObject);
    procedure tmr_TestTimer(Sender: TObject);
    procedure tb_KeluarClick(Sender: TObject);
    procedure sb_DirektoriKerjaClick(Sender: TObject);
    procedure tb_SetupClick(Sender: TObject);
    procedure tb_StartPCLClick(Sender: TObject);
    procedure tmr_PCLTimer(Sender: TObject);
    procedure CLSLayar;
    procedure PilihChannel( pChannel : byte);
    procedure PilihGain( pGain: byte);
    procedure tbnChange(Sender: TObject; NewTab: Integer;
      var AllowChange: Boolean);
    procedure tb_SimpanClick(Sender: TObject);
    procedure pm_KonfigurasiClick(Sender: TObject);
    procedure pm_TestClick(Sender: TObject);
    procedure pm_KeluarClick(Sender: TObject);
  private
    { Private declarations }
    test       : boolean;
    PortPCL    : word;
    PortLPT    : word;
    extHasil        : extended;
    extSkala        : extended;
    extSkalaKh      : extended;
    iLoop           : byte;
    chPutar         : array [0..15] of string;
    procedure AturPCL;
  public
    { Public declarations }
  end;

const
   Ya              = true;
   TIDAK           = false;
   cNamaProgram    = 'PCL Laboratorium Card';
   cNamaINI        = 'ULIL.INI';
   cTanggal        = 'Tanggal ..............:';
```

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```
   cJam             = 'Jam ...................:';
   cPortMasukan     = 'Port Masukan ..........:';
   cPortKeluaran    = 'Port Keluaran .........:';
   cSkala           = 'Skala .................:';
   cGain            = 'Gain ..................:';
   cWaktuTunda      = 'Waktu Tunda ...........:';
   cDirektoriKerja = 'Direktori Kerja .......:';
   cSkala1           = 5/2048;
   cSkala2           = 5/2/2048;
   cSkala4           = 5/4/2048;
   cSkala8           = 5/8/2048;
   cSkala16          = 5/16/2048;

var
  frm: Tfrm;

implementation

{$R *.DFM}

{=========================================}
procedure tfrm.AturPCL;
begin
asm
   {-- Atur Channel --}
   mov  dx,220h+10
   mov  al,0
   out  dx,al
end;
end;

{=========================================}
procedure Tfrm.FormCreate(Sender: TObject);
var
   lstr_Dummy : string;
begin
{--- Atur INIsialisasi Program ---}
AturINI( cNamaINI, cNamaProgram);
pps_wstr( cTanggal, datetostr( date));
pps_wstr( cJam,     timetostr( time));

{--- Baca Inisialisasi ---}
ed_Portmasukan.text    := pps_gstr( cPortMasukan);
ed_PortKeluaran.text   := pps_gstr( cPortKeluaran);
ed_Skala.text          := pps_gstr( cSkala);
ed_Gain.text           := pps_gstr( cGain);
ed_WaktuTunda.text     := pps_gstr( cWaktuTunda);
ed_DirektoriKerja.text := pps_gstr( cDirektoriKerja);

txt_PortMasukan.caption    := pps_gstr( cPortMasukan);
txt_PortKeluaran.caption   := pps_gstr( cPortKeluaran);
txt_Skala.caption          := pps_gstr( cSkala);
txt_Gain.caption           := pps_gstr( cGain);
```

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```
txt_WaktuTunda.caption     := pps_gstr( cWaktuTunda);

extSkala           := strtofloat( ed_Skala.text);
extSkalaKh         := strtofloat( ed_Skala.text);
txt_Skala.caption := formatfloat( '0.0000', extSkala);
test     := false;

PortPCL    := $220;  {= 220h}
PortLPT    := $378;  {= 378h}
PilihGain( strtoint( txt_Gain.caption));

AturPCL;
chPutar[0]  := '--';
chPutar[1]  := '\';
chPutar[2]  := '|';
chPutar[3]  := '/';
chPutar[4]  := '--';
chPutar[5]  := '\';
chPutar[6]  := '|';
chPutar[7]  := '/';
chPutar[8]  := '--';
chPutar[9]  := '\';
chPutar[10] := '|';
chPutar[11] := '/';
chPutar[12] := '--';
chPutar[13] := '\';
chPutar[14] := '|';
chPutar[15] := '/';
lstr_Dummy := datetostr( date) + '    ' + timetostr( time);
ed_Keterangan.text := lstr_Dummy;
end;

{=========================================}
procedure Tfrm.tb_TestClick(Sender: TObject);
begin
tmr_Test.enabled := not tmr_Test.enabled;
if tmr_Test.enabled then
   tb_Test.caption := '&Stop'
else
   begin
   txt_HasilTest.caption := '0';
   tb_Test.caption := '&Test';
   end;
end;

{=========================================}
procedure Tfrm.tmr_TestTimer(Sender: TObject);
label lbl_keluar;
var
   lwHasil  : word;
   lstrHasil : string;
begin
{}
```

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```
asm
   {-- baca --}
   mov  dx,220h+5
   in   al,dx
   shl  al,4
   and  al,1
   cmp  al,0
   jne  lbl_Keluar

   mov  dx,220h+5
   in   al,dx
   mov  ah,al
   and  ah,1111b
   dec  dx
   in   al,dx
   mov  lwHasil,ax

   {-- trigger --}
   mov  dx,220h+12
   mov  al,0
   out  dx,al
lbl_Keluar:
end;
extHasil  := lwHasil;
extHasil  := (extHasil - 2048) * extSkala * extSkalaKh;
lstrHasil := formatfloat( '0.0000', extHasil);

txt_HasilTest.caption := lstrHasil;
end;

{=========================================}
procedure Tfrm.tb_KeluarClick(Sender: TObject);
begin
tmr_PCL.enabled  := tidak;
tmr_Test.enabled := tidak;
frm.close;

end;

{=========================================}
procedure Tfrm.sb_DirektoriKerjaClick(Sender: TObject);
var
   lstrDirek : string;
begin
if SelectDirectory( lstrDirek, [sdAllowCreate, sdPerformCreate,
sdPrompt],0) then
   begin
   ed_DirektoriKerja.text := lstrDirek;
   end;
end;

{=========================================}
procedure Tfrm.tb_SetupClick(Sender: TObject);
```

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```
ır
  liInterval : integer;
  liGain     : integer;
egin
ır_PCL.enabled  := TIDAK;
ır_Test.enabled := TIDAK;

ıs_wstr( cPortMasukan,     ed_Portmasukan.text);
ıs_wstr( cPortKeluaran,    ed_PortKeluaran.text);
ıs_wstr( cSkala,           ed_Skala.text);
ıs_wstr( cGain,            ed_Gain.text);
ıs_wstr( cWaktuTunda,      ed_WaktuTunda.text);
ıs_wstr( cDirektoriKerja, ed_DirektoriKerja.text);

-- tulis ke layar tampilan --}
:t_PortMasukan.caption    := ed_Portmasukan.text;
:t_PortKeluaran.caption   := ed_PortKeluaran.text;
:t_Skala.caption          := ed_Skala.text;
:t_Gain.caption           := ed_Gain.text;
:t_WaktuTunda.caption     := ed_WaktuTunda.text;


- Waktu Tunda --}
.r_PCL.interval  := strtoint( ed_WaktuTunda.text);
.r_Test.interval := strtoint( ed_WaktuTunda.text);

- skala kh --}
tSkalaKh := strtofloat( ed_Skala.text);


- Gain --}
Gain := strtoint( ed_Gain.text);
lihGain( liGain);

d;

==========================================}
ocedure tfrm.PilihChannel( pChannel : byte);
gin
m
 mov  dx,PortLPT
 mov  al,pChannel
 out  dx,al
d;
d;

==========================================}
ocedure tfrm.PilihGain( pGain: byte);
gin
 pGain < 5 then
 begin
    asm
    mov  dx,220h
```

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```
      add  dx,9
      mov  al,pGain
      out  dx,al
      end;
   case pGain of
      0 : extSkala := cSkala1;
      1 : extSkala := cSkala2;
      2 : extSkala := cSkala4;
      3 : extSkala := cSkala8;
      4 : extSkala := cSkala16;
   end;

   end;
end;

{=========================================}
procedure Tfrm.CLSLayar;
var
   lext_Dummy : extended;
   lstr_Dummy : string;
begin
iLoop := 1;
lext_Dummy := 0.0;
lstr_Dummy := formatfloat( '0.0000', lext_Dummy);
ch1.caption  := lstr_Dummy;
ch2.caption  := lstr_Dummy;
ch3.caption  := lstr_Dummy;
ch4.caption  := lstr_Dummy;
ch5.caption  := lstr_Dummy;
ch6.caption  := lstr_Dummy;
ch7.caption  := lstr_Dummy;
ch8.caption  := lstr_Dummy;
ch9.caption  := lstr_Dummy;
ch10.caption  := lstr_Dummy;
ch11.caption  := lstr_Dummy;
ch12.caption  := lstr_Dummy;
ch13.caption  := lstr_Dummy;
ch14.caption  := lstr_Dummy;
ch15.caption  := lstr_Dummy;
ch16.caption  := lstr_Dummy;
end;

{=========================================}
procedure Tfrm.tb_StartPCLClick(Sender: TObject);
begin
tmr_PCL.enabled := not tmr_PCL.enabled;
if tmr_PCL.enabled then
   begin
   tb_StartPCL.caption := '&Stop';
   iLoop := 1;
   end
else
   begin
```

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```
    tb_StartPCL.caption := '&Start PCL';
{    CLSLayar;}
    end;
end;

{=========================================}
procedure Tfrm.tmr_PCLTimer(Sender: TObject);
label lbl_keluar;
var
    lwHasil   : word;
    lstrHasil : string;
begin
asm
    {-- baca --}
    mov  dx,220h+5
    in   al,dx
    shl  al,4
    and  al,1
    cmp  al,0
    jne  lbl_Keluar

    mov  dx,220h+5
    in   al,dx
    mov  ah,al
    and  ah,1111b
    dec  dx
    in   al,dx
    mov  lwHasil,ax

    {-- trigger --}
    mov  dx,220h+12
    mov  al,0
    out  dx,al
bl_Keluar:
nd;
xtHasil  := lwHasil;
xtHasil  := (extHasil - 2048) * extSkala * extSkalaKh;
xtrHasil := formatfloat( '0.0000', extHasil);

se iLoop of
   1: ch1.caption := lstrHasil;
   2: ch2.caption := lstrHasil;
   3: ch3.caption := lstrHasil;
   4: ch4.caption := lstrHasil;
   5: ch5.caption := lstrHasil;
   6: ch6.caption := lstrHasil;
   7: ch7.caption := lstrHasil;
   8: ch8.caption := lstrHasil;
   9: ch9.caption := lstrHasil;
  10: ch10.caption := lstrHasil;
  11: ch11.caption := lstrHasil;
  12: ch12.caption := lstrHasil;
  13: ch13.caption := lstrHasil;
```

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```
   14: ch14.caption := lstrHasil;
   15: ch15.caption := lstrHasil;
   16: ch16.caption := lstrHasil;
end;{case}
iLoop := iLoop + 1;
if iLoop = 17 then
   begin
   iLoop := 1;
{   CLSLayar;}
   end;
PilihChannel( iLoop);

txt_Putar.caption := chPutar[ iLoop-1];


end;

{=========================================}
procedure Tfrm.tbnChange(Sender: TObject; NewTab: Integer;
  var AllowChange: Boolean);
begin
tmr_PCL.enabled  := tidak;
tmr_Test.enabled := tidak;
CLSLayar;
end;

{=========================================}
procedure Tfrm.tb_SimpanClick(Sender: TObject);
var
   liLoop            : integer;
   lstrNomorChannel  : string;
   lstrNamaFile      : string;
   lstrNilai         : string;
begin
for liLoop := 1 to 16 do
   begin
   if liLoop > 9 then
      lstrNomorChannel := 'ch'  + inttostr( liLoop)
   else
      lstrNomorChannel := 'ch ' + inttostr( liLoop);
   lstrNamaFile      := ed_DirektoriKerja.text + '\' +
                        ed_NamaFile.text;
   ppsw( lstrNamaFile,
         'DATA PCL (c) 97, Riyanto Kurniawan',
         'Tanggal ...:',
         datetostr( date));
   ppsw( lstrNamaFile,
         'DATA PCL (c) 97, Riyanto Kurniawan',
         'Jam .......:',
         timetostr( time));
   ppsw( lstrNamaFile,
         'DATA PCL (c) 97, Riyanto Kurniawan',
         'Keterangan :',
```

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```
      ed_Keterangan.text);
   case liLoop of
       1 : lstrNilai := ch1.caption;
       2 : lstrNilai := ch2.caption;
       3 : lstrNilai := ch3.caption;
       4 : lstrNilai := ch4.caption;
       5 : lstrNilai := ch5.caption;
       6 : lstrNilai := ch6.caption;
       7 : lstrNilai := ch7.caption;
       8 : lstrNilai := ch8.caption;
       9 : lstrNilai := ch9.caption;
      10 : lstrNilai := ch10.caption;
      11 : lstrNilai := ch11.caption;
      12 : lstrNilai := ch12.caption;
      13 : lstrNilai := ch13.caption;
      14 : lstrNilai := ch14.caption;
      15 : lstrNilai := ch15.caption;
      16 : lstrNilai := ch16.caption;

   end;
   ppsw( lstrNamaFile,
         'DATA PCL (c) 97, Riyanto Kurniawan',
         lstrNomorChannel,
         lstrNilai);
   end;
end;

{=========================================}
procedure Tfrm.pm_KonfigurasiClick(Sender: TObject);
begin
tbn.pageindex := 1;
end;

{=========================================}
procedure Tfrm.pm_TestClick(Sender: TObject);
begin
tbn.pageindex := 2;
end;

{=========================================}
procedure Tfrm.pm_KeluarClick(Sender: TObject);
begin
tb_KeluarClick(Sender);
end;

end.
```

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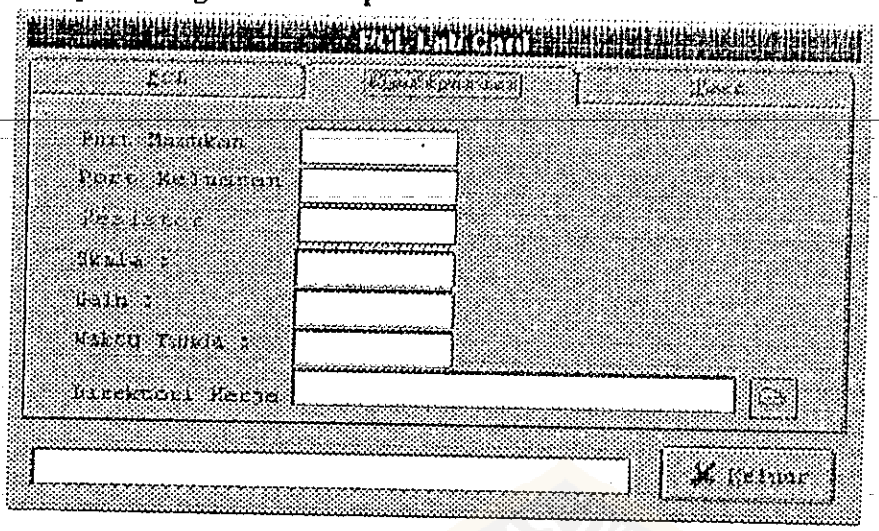
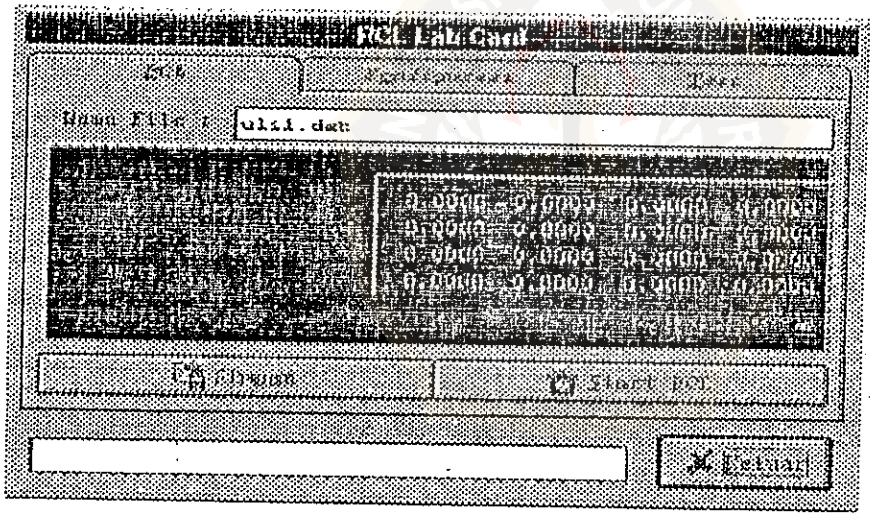
Lampiran III

Tampilan Program RES dengan *Delphi*

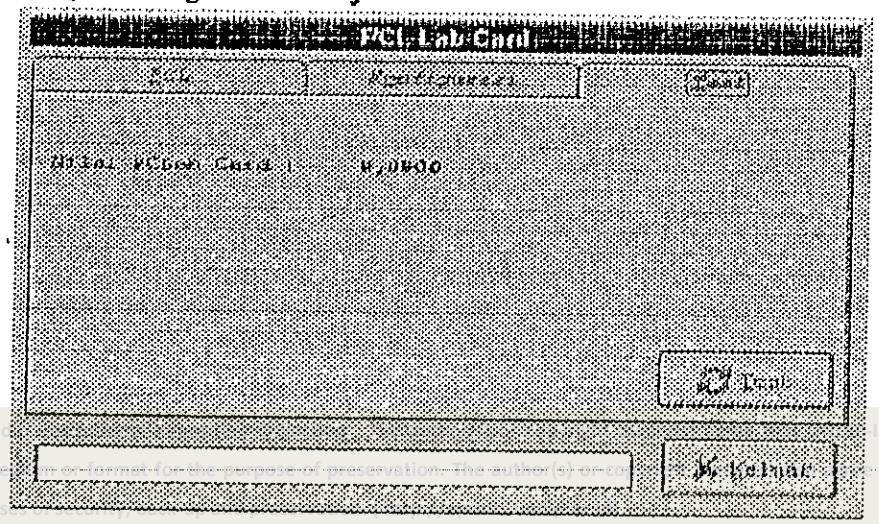
Tampilan Program RES Input



Tampilan Program RES Proses



Tampilan Program RES Uji Alat



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BIOGRAFI PENULIS

Riyanto Kurniawan, SSi

Riyanto Kurniawan dilahirkan di Semarang Jawa Tengah. Pada umur 3 tahun Ia dan keluarga berpindah kota ke Magelang. Pendidikan dasar diawali di TK Siwipeni Wates Magelang, kemudian melanjutkan di SDN Kalinegoro IV Magelang. Pendidikan menengah diawali di SMPN Kota Mungkid, Setelah lulusdari SMA Muhamadiyah I Magelang, Ia melanjutkan di Universitas Diponegoro Semarang dan pada tahun 1998 memperoleh gelar Sarjana Sains (Ssi) Jurusan Fisika Universitas Diponegoro Semarang. Semenjak mahasiswa Ia aktif dalam berbagai bidang pendidikan antara lain :

1. Th. 1992-1994, memberikan pendidikan khusus untuk bidang Matematika dan Fisika kelas III di SMAM I Magelang untuk Ebtanas dan UMPTN.
2. Th. 1994-1995, menjadi tentor kehormatan bidang Matematika Dasar dan Matematika IPA di Lembaga Pendidikan CITRA MANDIRI DPD LAMPI JATENG.
3. Th. 1994-1997, Koordinator dan Asisten Luar Biasa Praktikum Fisika Dasar Universitas Diponegoro untuk jurusan : Kedokteran, Teknik sipil, Teknik elektro, Teknik mesin Teknik Planologi, Teknik Kimia, MIPA, FKM, Kelautan, dan pernah terpilih sebagai Asisten Terbaik di MIPA.
4. Th. 1996, Mendapat tugas kepercayaan memberikan Matrikulasi Teori dan Praktikum Fisika Dasar untuk mahasiswa baru jalur PSSB UNDIP.
5. Mulai Th. 1995 menjadi Staf Pengajar Fisika di Primagama Semarang.
6. Awal Th. 1997 menjadi Dosen Mata Kuliah Mathematics For Bisnis dan Statistics For Bisnis di Jakarta Teknologi Cipta.

Salah satu penelitian yang berhasil dilaksanakan untuk Tugas Akhir adalah "PEMBUATAN PROGRAM KOMPUTER SITEM WINDOWS UNTUK PENGAMBILAN DAN PEREKAMAN DATA MODEL FISIS METODA GEOFISIKA RESISTIVITAS".

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