

# DIEFGEO

IMPCURV: DYF: 1. derivative Y'(X) DY2F: 2. derivative Y''(X) (0.8s) FX0,FY0: solves F=0 to X,Y with start value (1s)	<pre> 4: 3:      X^2+Y^2-R^2 2:      -X 1:      X^2+Y^2           Y^3           </pre>	<pre> 8: 7: 6: 5:      X^2+Y^3-4 4: 3:      1.44224957031 2: 1:      1.73205080757           </pre>
IMPCURV: GRF: graph of implicit curve (Lemniscate) input  graph (2min)	<pre> 7: 6: 5: 4:      (X^2+Y^2)^2-2(X^2-Y^2)=0 3:      (-1.57 1.57 -2. 2.) 2:      60 1:      1           </pre>	
IMPCURV: TanlF: tangent line of implicit curve (1.2s)  NorlF: normal line of implicit curve (1.2s)	<pre> 6: 5: 4:      X^2+Y^2-R^2 3:      'X0' 2:      'Y0' 1:      Y=X0^2-X*X0+Y0^2           Y0           </pre>	<pre> RAD HY2 DEC R= 'X' ~CURVES IMPCURV3 USR 5: 4:      X^2+Y^2-R^2 3:      'X0' 2:      'Y0' 1:      Y=X*Y0           X0           </pre>
IMPCURV: IDX: implicit derivative (1s)  CurvF: curvature of implicit curve (1s)	<pre> RAD HY2 DEC R= 'X' ~CURVES IMPCURV3 USR 6: 5: 4: 3: 2:      X^2+Y^2-R^2 1:      2*Y(X)*d1Y(X)+2*X           </pre>	<pre> RAD HY2 DEC R= 'X' ~CURVES IMPCURV3 USR 5: 4:      X^2+Y^2-R^2 3:      'X0' 2:      'Y0' 1:      - 8*X^2+8*Y^2           (2*sqrt(X^2+Y^2))^3           </pre>
IMPCURV: CcurvF: centre of curvature (1.4s)  FdetF: determinant Fxx*Fyy- Fxy^2 (0.2s)	<pre> 8: 7: 6: 5: 4: 3: 2:      X^2+Y^2-R^2 1:      (0 0)           </pre>	<pre> 8: 7: 6: 5: 4: 3: 2:      X^2+Y^2-R^2 1:      4           </pre>
POLCURV: FΘ0: function value (1.5s)  GRΘ: graph of 4*COS(2*Θ) (10s) with tangent and normal line, see below	<pre> 8: 7: 6: 5: 4:      4*COS(2*Θ) 3: 2: 1:      -1.66458734619           </pre>	
POLCURV: DYΘ: first derivative (1.5s) D2Y Θ: 2. derivative (2.2s) TanlΘ: tangent line (3s) NorlΘ: normal line (3s) in approximate mode	<pre> RAD HY2 DEC R= 'X' ~CURVES POLCURV3 USR 6: 5: 4: 3:      4*COS(2*Θ) 2:      2*SIN(Θ)*SIN(2*Θ)+COS(Θ)*COS(2*Θ) 1:      128*SIN(2*Θ)^2+80*COS(2*Θ)^2           </pre>	<pre> RAD HY2 DEC R= 'X' ~CURVES POLCURV3 USR 5: 4:      4*COS(2*Θ) 3:      1.09534436356 2:      SIN(Θ)-2.77529549064*COS(Θ) 1:      SIN(Θ)+.360321392153*COS(Θ)           </pre>
POLCURV: ArclΘ: arclength (4s) CurvΘ: curvature (1s)  CcurvΘ: centre of curvature (2.3s)	<pre> 6:      'Θ' 5:      0 4:      1 3:      Ln(-1+sqrt(2))-sqrt(2) 2:      'Θ' 1:      (Θ^2+2) / ((Θ^2+1)*sqrt(Θ^2+1))           </pre>	<pre> 7: 6: 5: 4:      'Θ' 3: 2: 1:      { (Θ^2+1)*SIN(Θ)-Θ*COS(Θ)  Θ*SIN(Θ)           (Θ^2+2)           }           </pre>

<p>PARCURV: FT0: function value (0.6s) in approximate mode</p> <p>GRT: graph of curve (5s)</p>	<pre> RAD XYZ DEC R= 'X' \CURVES PARCURV3 USR 4: 3:      {2·COS(T)}       {2·SIN(T)} 2:      1 1:      {1.08060461174}       {1.68294196962} CT2   CT3   DT   IT   FT0   GRT </pre>	
<p>PARCURV: DYT, D2YT: 1., 2. derivative of R2-curve (0.6s)</p> <p>GRNT: two projections of the helix 1 2, 2 3 (5s)</p>	<pre> 4:      {R·COS(T)} 3:      {R·SIN(T)} 2:      {COS(T)} 1:      {SIN(T)} GRNT   RNT   SNT   DYT   D2YT   TanIT </pre>	
<p>PARCURV: TanIT, NorIT: tangent, normal line of R2 curve(0.6s)</p> <p>ArcIT: arclength of helix (3s)</p>	<pre> 5:      {R·COS(T)} 4:      {R·SIN(T)} 3:      {R} 2:      {T·R} 1:      {-(T-1)·R} NorIT   ArcIT   ArcST   CurvT   CurvT   TorsT </pre>	<pre> RAD XYZ DEC R= 'X' \CURVES PARCURV3 USR 7: 6: 5: 4:      {2·COS(T) 2·SIN(T) 1·T} 3:      0 2:      1 1:      √5 TanIT   NorIT   ArcIT   ArcST   CurvT   CurvT </pre>
<p>PARCURV: CurvT: curvature (10s) Torsion: torsion of helix (9s) Tanvect: tangent vector (14s) Norvect: normal vector (5s) Binvect: binormal vect. (17s)</p>	<pre> 5: 4:      {p·COS(T) p·SIN(T) σ·T} 3:      {p·√(p²+σ²)·SIN(T) p·√(p²+σ²)·COS(T)} 2:      {p²+σ²} 1:      {σ} NorIT   ArcIT   ArcST   CurvT   CurvT   TorsT </pre>	<pre> RAD XYZ DEC R= 'X' \CURVES PARCURV3 USR 7: 6: 5: 4:      {p·COS(T) p·SIN(T) σ·T} 3:      {p·√(p²+σ²)·SIN(T) p·√(p²+σ²)·COS(T)} 2:      {p²+σ²} 1:      {σ} Tanvect   Norvect   Binvect   ArcIT   ArcST   CurvT </pre>
<p>PARCURV: LintT: line integral (2s)</p> <p>AreaT: area enclosed by curve (5s)</p>	<pre> 8: 7: 6: 5:      {R·COS(T) R·SIN(T)} 4:      {T² T} 3:      0 2:      1 1:      2·R·SIN(1)+R·COS(1)-R Tanvect   Norvect   Binvect   ArcIT   ArcST   CurvT </pre>	<pre> RAD XYZ DEC R= 'X' \CURVES PARCURV3 USR 7: 6: 5: 4:      {A·COS(T) B·SIN(T)} 3:      0 2:      2·π 1:      B·A·π AreaT   Respa   Dsart   Help   ZPAR   Ee </pre>
<p>IMPSURF: NorlinF: normal line (1s)</p> <p>TanplF: tangent plane of implicit surface (1.3s)</p>	<pre> RAD XYZ DEC R= 'X' \RFACES IMPSURF3 USR 6: 5:      X²+Y²+Z²-R² 4:      {R} 3:      0 2:      0 1:      {R+2·R·T 0 0} FXYZ   DX   DY   DZ   NorLI   TanplF </pre>	<pre> RAD XYZ DEC R= 'X' \RFACES IMPSURF3 USR 6: 5:      X²+Y²+Z²-R² 4:      1 3:      0 2:      0 1:      2·X+4·Y+6·Z-28=0 FXYZ   DX   DY   DZ   NorLI   TanplF </pre>
<p>EXPSURF: NorlinZ: normal line (1.5s)</p> <p>TanplZ: tangent plane of explicit surface(1.5s)</p>	<pre> RAD XYZ DEC R= 'X' \RFACES EXPSURF3 USR 6: 5: 4:      X³·Y-X·Y³ 3:      1 2:      1 1:      {2·T+1 -(2·T-1) -T} ZXY   DX   DY   NorLI   TanplF   F30xx </pre>	<pre> RAD XYZ DEC R= 'X' \RFACES EXPSURF3 USR 6: 5: 4:      X³·Y-X·Y³ 3:      1 2:      1 1:      2·X-(2·Y+Z)=0 ZXY   DX   DY   NorLI   TanplF   F30xx </pre>
<p>PARSURF: FUOV0: function value (2s)</p> <p>TanplS: tangent plane (3s)</p>	<pre> RAD XYZ DEC R= 'X' \RFACES PARSURF3 USR 6: 5: 4:      {R·COS(U)·SIN(V) R·SIN(U)·SIN(V)} 3:      0 2:      π/2 1:      {R 0 0} FUOV0   NorLI   NorLI   TanplF   Metri   Dets </pre>	<pre> RAD XYZ DEC R= 'X' \RFACES PARSURF3 USR 7: 6: 5: 4:      {R·COS(U) R·SIN(U) V} 3:      0 2:      0 1:      {R U R V} FUOV0   NorLI   NorLI   TanplF   Metri   Dets </pre>

<b>PARSURF:</b> NorvecS: normal vector (3s)  NorlinS: normal line (5s)	RAD XYZ DEC R= 'X' ~RFACES PARSURF> USR 7: 6: 5: 4: 3: 2: (R·COS(U) R·SIN(U) V) 1: (COS(U) SIN(U) 0) SPHER RUV DU DV IU IV FU0V0NorucNorl3Tanp4Metri5Detg	RAD XYZ DEC R= 'X' ~RFACES PARSURF> USR 7: 6: 5: 4: (R·COS(U)·SIN(V) R·SIN(U)· 3: 0 2: 0 1: (0 0 R) FU0V0NorucNorl3Tanp4Metri5Detg
<b>PARSURF:</b> Metric: metric of sphere (10s)  Detg: determinant of metric (11s)	RAD XYZ DEC R= 'X' ~RFACES PARSURF> 4: 3: 2: (R·COS(U)·SIN(V) R·SIN(U)· 1: $\begin{bmatrix} R^2 \cdot \sin^2(V) & 0 \\ 0 & R^2 \end{bmatrix}$ FU0V0NorucNorl3Tanp4Metri5Detg	RAD XYZ DEC R= 'X' ~RFACES PARSURF> USR 4: 3: 2: $\begin{bmatrix} R \cdot \cos(U) \cdot \sin(V) \\ R \cdot \sin(U) \cdot \sin(V) \\ R \cdot \cos(V) \end{bmatrix}$ 1: $R^2 \cdot \sin(V)$ FU0V0NorucNorl3Tanp4Metri5Detg
<b>PARSURF:</b> I.,II.Funf: 1. ,2. fundamental form of cylinder (2, 4s)  main, Gauss curvature of cylinder (7s)	4: 3: $\begin{bmatrix} R \cdot \cos(U) \\ R \cdot \sin(U) \\ V \end{bmatrix}$ 2: $R^2 \cdot dU^2 + dV^2$ 1: $-[R \cdot dU^2]$ I.FunII.FuHcurvGcurvArclSAreas	4: 3: (R·COS(U) R·SIN(U) V) 2: $\begin{bmatrix} -1 \\ 0 \end{bmatrix}$ 1: 0 I.FunII.FuHcurvGcurvArclSAreas
<b>PARSURF:</b> ArclS: arclength of curve in surface (4s)  AreaS: area of surface (4s)	4: 3: 2: 1: (R·COS(U) R·SIN(U) V) (T 0) 0 2·π 2·R·π I.FunII.FuHcurvGcurvArclSAreas	4: 3: 2: 1: (R·COS(U) R·SIN(U) V) 0 2·π 0 'H' 2·R·H·π I.FunII.FuHcurvGcurvArclSAreas