

PDEQ

<p>PDEQ: →PD: bookform to PDE (1s) d→der: d to derivatives</p> <p>Uijkl: generate partial derivatives (0.5s)</p>		
<p>PDEQ: U→PD: solution in PDE (1s)</p> <p>Subst, U→PD: substitute special f,g, determine U, check solution</p>		
<p>PDSOL: U->PD insert solution</p>		
<p>PDSOL: help</p>		
<p>PDSOL: PDL1: choosebox</p> <p>PDN1: choosebox</p>		
<p>PDSOL: PDLH: choosebox</p>		
<p>PDSOL: PDNH: choosebox</p>		
<p>PDSOL: PDL1: examples</p>		

<p>PDSOL: PDN1: example U->PD: insert solution(2s)</p> <p>PDN1: example U->PD: insert solution(17s)</p>	<pre> RAD XYZ DEC W= 'X' >ONE PDEQ PDSOL3 USE 5: 4: 3: 2: a*UX^2+b*UY^2=c {U=C1*X+C2*Y+C3} {c=a*C1^2+b*C2^2} 1: 0=0 Help U->PD Subst Solve +Fund Desol </pre>	<pre> 5: 4: 3: 2: UX^2+UY^2=F(X)+G(Y) U=RISCH(sqrt(F(X)+C1),X)+RISCH(sqrt(G(Y)+C2),Y) 1: 0=0 Help U->PD Subst Solve +Fund Desol </pre>
<p>PDSOL: PDLH: examples</p> <p>U->PD: insert solution(7s)</p>	<pre> 7: 6: 5: 4: 3: 2: Wave: (UTT=a^2*UXX) U=F(X+a*T)+g(X-a*T) Klein-Gordon: (UTT=a^2*UXX-b*U) part.sol.: {b=-a^2*x^2+u^2} Laplace: (UXX+UYX=0) part.sol.: {U=A*X+B*Y+C U=A*(X^2, 1: nearly general: (analytic F: t) PDL1 PDN1 PDLH PDNH Help PDL11 </pre>	<pre> 5: 4: 3: 2: 1/r * d/dr (r * d/dr (H(r,omega))) + 1/r^2 * d^2/dr^2 (H(r,omega)) = 0 H(r,omega) = A * r^H + B/r^H part.sol.: {H(r,omega) = (A * r^H + B/r^H) * C(t)} 1: 0=0 Help U->PD Subst Solve +Fund Desol </pre>
<p>PDLH: linear heat solutions</p> <p>U->PD: insert solution with Erf function (28s)</p> <p>dEval: evaluate derivative of special function(15s)</p>	<pre> 6: 5: 4: 3: 2: 1: UT=a*UXX some part.sol.: {U=A*X+B U=A*(X^2, PDL1 PDN1 PDLH PDNH PDS Help </pre>	<pre> 5: 4: 3: 2: 1: UT=a*UXX U=A*Erf(sqrt(X/(4*a*T)))+B X*sqrt(A*a)*d1Erf(sqrt(X/(4*a*T)))+sqrt(A*a)*d1d 4*sqrt(A*a)*T^2 1: 0=0 T-HA dEval ->PD d+der U1,X1 D1Hnd </pre>
<p>PDSOL: PDLH: some solutions of the Laplace equation</p> <p>PDNH: some solutions of Burgers PD</p>	<pre> 7: 6: 5: 4: 3: 2: 1: UXX+UYX=0 U=A*X+B*Y+C U=A*(X^2-Y^2)+B*X*Y U=A*(X^2-3*X*Y^2)+B*(3*X^2*Y-Y^3) U=(A*X+B*Y)/(X^2+Y^2)+C U=e^(mu*X)*(A*cos(mu*Y)+B*sin(mu*Y)) U=e^(mu*Y)*(A*cos(mu*X)+B*sin(mu*X)) PDL1 PDN1 PDLH PDNH PDS Help </pre>	<pre> 5: 4: 3: 2: 1: UT=UXX+U*UX U=A+(X^2+Y^2)/(X^2+Y^2+A) U=(X^2+A*X+2*Y+B)/(X^2+Y^2+A) U=(1+A*e^(-X^2+Y^2-A*X)) PDL1 PDN1 PDLH PDNH PDS Help </pre>
<p>PDSOL: PDNH: examples</p>	<pre> 4: 3: 2: 1: Burgers: (UT=UXX+U*UX) part.sol.: {U=A+(X^2+Y^2)/(X^2+Y^2+A) cubic Schroedinger: (i*UT+UXX+U^3) U=C1*e^(i*(C2*X+(K*C1^2-C2^2)*T+C3)) PDL1 PDN1 PDLH PDNH Help PDL11 </pre>	<pre> 4: 3: 2: 1: Sine Gordon: (UT=a*UXX+b*SIN(U)) {b*x*(mu^2-a*x^2)>0: U=(u/a)*ATAN(t)} Korteweg-de Vries: (UT+UXXX-6*U*U*X) one soliton: U=(sqrt(a)/(2*cosh(sqrt(a)*(X-a*t))) PDL1 PDN1 PDLH PDNH Help PDL11 </pre>
<p>PDSOL: PDNH: insert solution</p> <p>PDN1: insert solution (4s)</p>	<pre> 7: 6: 5: 4: 3: 2: 1: Burgers: (UT=UXX+U*UX) U=A+(X^2+Y^2)/(X^2+Y^2+A) 0=0 cubic Schroedinger: (i*UT+UXX+U^3) U=C1*e^(i*(C2*X+(K*C1^2-C2^2)*T+C3)) 0=0 Help U->PD Subst +Fund Solve DTAG </pre>	<pre> 5: 4: 3: 2: 1: Clairaut: (U=X*UX+Y*UY+F(X,Y)) U=C1*X+C2*Y+F(C1,C2) 0=0 Help U->PD Subst +Fund Solve DTAG </pre>
<p>PD1O: LP1XY: linear partial diff.eq. of 1. order, char. eq. (6s)</p> <p>U->DE: insert solution (4s)</p>	<pre> 5: 4: 3: 2: 1: 2*X*UX+1/Y*UY=0 d/dX (Y(X)) = 1/(2*Y(X)*X) F(-(LN(X)-Y^2)) Examp PDE LP1XY Qlcs Nlcs Help </pre>	<pre> 5: 4: 3: 2: 1: 2*X*UX+1/Y*UY=0 F(-(LN(X)-Y^2)) 0=0 Help ->PDE U->DE D1sol D1Hnd D1Hnd </pre>
<p>PD1O: Qlcs: (quasi-) linear system to char. system (1.6s)</p> <p>Qlcs: second example (2s)</p>	<pre> 4: 3: 2: 1: X*UX+2*Y*U2=U {d/dX (Y(X))=0} {d/dX (Z(X))=2*Y/X} {d/dX (U(X))=U/X} Examp PDE LP1XY Qlcs Nlcs Help </pre>	<pre> 5: 4: 3: 2: 1: X*UX+Y*U*UY-X*Y=0 {d/dX (Y(X))=Y/X} {d/dX (U(X))=U/X} Examp PDE LP1XY Qlcs Nlcs Help </pre>

PD1O: Nlcs: char. system of nonlinear PDEQ (4s) PD2O: LPC2XY: solve linear PDEQ of 2. order (4s)	<pre> 8: 7: 6: 5: 4: 3: 2: 1: Ux^2+Uy^2+Uz^2-5=0 { d/dX(Y(X))=Uy/dX d/dX(Z(X))=Uz/dX d/dX(U)=0 } Examp PDE LP1XY Qlcs Nlcs Help </pre>	<pre> 8: 7: 6: 5: 4: 3: 2: 1: Uxx-(4*Uxy-3*Uyy)=0 U: (g(3*X+Y)+h(X+Y)) Examp PDE C+NF LPC2X TLIST V+CH </pre>
PD2O: LPC2XY: solve linear partial differential eq. of 2. order (4s), U→DE (8s) U→DE: insert solution (40s)	<pre> 8: 7: 6: 5: 4: 3: 2: 1: 2*Uxx+2*Uxy+Uyy=0 g(-(1-i)*X-2*Y)/2+h(-(1+i)*X-2*Y)/2 d=0 Help +PDE U+DE Disol UijkL Dlnno </pre>	<pre> 8: 7: 6: 5: 4: 3: 2: 1: Uxx+4*Uxy+4*Uyy+Ux+2*Uy=0 g(-(2*X-Y))/2+h(-(2*X-Y))/2 d=0 Help +PDE U+DE Disol UijkL Dlnno </pre>
PD2O: V→CH: linear PDEQ to char. system (11s) C→NF: PDEQ with constant coeff. to transformations and normal form (4s)	<pre> 4: 3: 2: 1: X*Uxx+Uyy+1/2*Ux=0 { d/dX(Y(X))=-sqrt(X)*h1/X^2 d/dX(Y(X))=-sqrt(X)*h1/X^2 } Examp PDE C+NF LPC2X TLIST V+CH </pre>	<pre> 8: 7: 6: 5: 4: 3: 2: 1: Uxx-(4*Uxy-3*Uyy)=0 { X=3*X+Y U=X+Y -(4*Uxy)=0 } Examp PDE C+NF LPC2X TLIST V+CH </pre>
PD2O: Pdsep: separable PDEQ (5s) Dlsolve: solve x component (6s)	<pre> 2: 1: Uxx+Uyy=1/2*UTT { d/dX(d/dX(F(X)))=h*F(X) d/dY(d/dY(F(Y)))=h*F(Y) -1/2*d/dT(d/dT(F(T)))=h*F(T) } Examp PDE C+NF LPC2X V+CH Pdsep </pre>	<pre> 6: 5: 4: 3: 2: 1: d/dX(d/dX(F(X)))=h*F(X) d/dY(d/dY(F(Y)))=h*F(Y) h*CC0-sqrt(h)*CC1*exp(-(sqrt(h)*X))+h*CC0+sqrt(h)* 2*h Help +PDE U+DE Disol UijkL Dlnno </pre>