Lösungen für das Modul Ma-P3/WiMa-ABK2
Software-Praktikum
Blatt 9

- **Aufgabe 1**

```
PosDef:=proc(A) local i,j,n,p,K,B;
          B:=true;
       n:=Dimension(A)[1]
     p:=unapply(charPol(A),t);
 K:=[seq(coeff(p(t),t,i),i=0..n)];
        for j from 1 to n do
       if (-1)^{j-1}*K[j]<=0
          then B:=false
               fi;
               od;
            RETURN(B);
              end;
```

- **Aufgabe 2**

```
PosDef2:=proc(A) local i,n,B;
           B:=true;
        n:=Dimension(A)[1];
        for i from 1 to n do
   if Determinant(A[1..i,1..i])<=0
          then B:=false
               fi;
               od;
            RETURN(B);
              end;
```

- **Aufgabe 3**

```
         Grad:=proc(f) local x,y,z;
  unapply(Vector[diff(f(x,y,z),x), diff(f(x,y,z),y),
         diff(f(x,y,z),z)],x,y,z)
                 end;
       Hesse:=proc(f) local x,y,z;
     unapply(Matrix([[diff(f(x,y,z),x$2),
 diff(diff(f(x,y,z),y),x), diff(diff(f(x,y,z),z),x)],)
    [diff(diff(f(x,y,z),x),y), diff(f(x,y,z),y$2),
         diff(diff(f(x,y,z),z),y)],
 [diff(diff(f(x,y,z),x),z), diff(diff(f(x,y,z),y),z),
      diff(f(x,y,z),z$2)]]),x,y,z); end;
```

- **Aufgabe 4** Die Antworten $a), b)$ und $d)$ sind korrekt.