```
(*             Filename: Example2.m                  *)
Print["The input file ",$InputFileName," is loaded !"];

(*  Modify control parameters in BVPh if necessary  *)

(*          Define the governing equation           *)
TypeEQ = 1;
NumEQ = 3;
f[1,z_,{f_,θ_,ϕ_},Lambda_]:=(1+α)∂{z,3}f-(n1+1)/2*α*λ*(∂{z,2}f)^2 ∂{z,3}f+f*∂{z,2}f-(2*
+Fs (∂{z,1}f)^2);
f[2,z_,{f_,θ_,ϕ_},Lambda_]:=1/Pr (1+δ*θ+Nr (1+(θb-1)θ)^3)∂{z,2}θ+3/Pr (Nr(θb-1)(1+(
+Ec*(∂{z,2}f)^2 ((1+α)-(n1+1)/6*α*λ*(∂{z,2}f)^2)+2/(n1+1) (Da*(∂{z,1}f)^2+Fs*(∂{z,1}f)^
f[3,z_,{f_,θ_,ϕ_},Lambda_]:=∂{z,2}ϕ+Sc(f*∂{z,1}ϕ-2/(n1+1)*γ1*ϕ)+Nt/Nb ∂{z,2}θ;
```

```
(*             Define Boundary conditions             *)
NumBC = 7;
BC[1,z_,{f_, θ_, ϕ_}] := (f-fw)/. z -> 0;
BC[2,z_,{f_, θ_, ϕ_}] := (∂{z,1}f-1)/. z -> 0;
BC[3,z_,{f_, θ_, ϕ_}] := (∂{z,1}θ+B1(1-θ))/. z -> 0;
BC[4,z_,{f_, θ_, ϕ_}] := (∂{z,1}ϕ+B2(1-ϕ))/. z -> 0;
BC[5,z_,{f_, θ_, ϕ_}] := ∂{z,1}f/. z -> infinity;
BC[6,z_,{f_, θ_, ϕ_}] := θ/. z -> infinity;
BC[7,z_,{f_, θ_, ϕ_}] := ϕ/. z -> infinity;
(* solution interval and integral interval for error *)
zL[1] = 0;
zR[1] = infinity;
zL[2] = 0;
zR[2] = infinity;
zL[3] = 0;
zR[3] = infinity;
zRintegral[1] = 20;
zRintegral[2] = 20;
zRintegral[3] = 20;
```

```
(*             Define initial guess                   *)
U[1, 0]=1+fw-E^(-z) ;
U[2, 0]=(B1*E^(-z))/(1+B1);
U[3, 0]=(B2*E^(-z))/(1+B2);
```

```
(*      Defines the auxiliary linear operator        *)
L[1, u_] := ∂z,z,zu+∂{z,2}u;
L[2, u_] := ∂z,zu+∂{z,1}u;
L[3, u_] := ∂z,zu+∂{z,1}u;
```

```
(*      Define physical and control parameters      *)
λ=0.1;n1=0.1;H1=0.1;λ1=0.1;R=0.1;Da=0.1;Fs=0.1;δ=0.1;Nt=0.1;Ec=0.1;γ1=0.1;α=0.1;B1=0
(*                Print input data                  *)
PrintInput[{f[z], Θ[z], ϕ[z]}];

(*                  Get optimal c0                  *)
GetOptiVar[4,{},{c0[1],c0[2],c0[3]}];
```

```
(*       Gain 10th-order HAM approximation          *)
BVPh[1, 10];
```