

Appendix A. Program for graph no: 5

with(Shoot);

> *with(plots) :*

> $\sigma := -0.25; \lambda := 0.1; M := 1; \xi := -1; S$
 $:= 2;$

> $Pr := 2; \delta := 0.1; \beta := 0.1;$

> $blt1 := 6; blt2 := 6;$

> $FNS := \{F(\eta), Fp(\eta), Fpp(\eta), \theta(\eta), \theta p(\eta)\};$

> $ODE := \left\{ \begin{aligned} &diff(F(\eta), \eta) = Fp(\eta), diff(Fp(\eta), \eta) = Fpp(\eta), \\ &diff(Fpp(\eta), \eta) = \frac{1}{(1 - \lambda \cdot Fpp(\eta))} \cdot (2 \cdot Fp(\eta)^2 - F(\eta) \\ &\cdot Fpp(\eta) + M \cdot Fp(\eta) - 2 \cdot \sigma \cdot \theta(\eta)), diff(\theta(\eta), \eta) = \theta p(\eta), \\ &diff(\theta p(\eta), \eta) = Pr \cdot (4 \cdot Fp(\eta) \cdot \theta(\eta) - F(\eta) \cdot \theta p(\eta)) \end{aligned} \right\};$

> $IC1 := \{F(0) = S, Fpp(0) = \alpha, Fp(0) = \xi + \delta \cdot \alpha, \theta p(0) = \psi, \theta(0)$
 $= 1 + \beta \cdot \psi, \};$

> $BC1 := \{Fp(blt1) = 0, \theta(blt1) = 0\}; BC2 := \{Fp(blt2) = 0, \theta(blt2)$
 $= 0\};$

> $infolevel[shoot] := 1 :$

> $S1 := shoot(ODE, IC1, BC1, FNS, [\alpha$
 $= 1.5105195266, \psi = -1.655971477,])$:

`"shoot: Step # 1`

`shoot: Parameter values : alpha = 1.5105195266 psi = -`
`1.655971477`

`shoot: Step # 2`

`shoot: Parameter values : alpha = HFloat(1.510521218439437) psi`
`= HFloat(-1.6559738241753188)"`

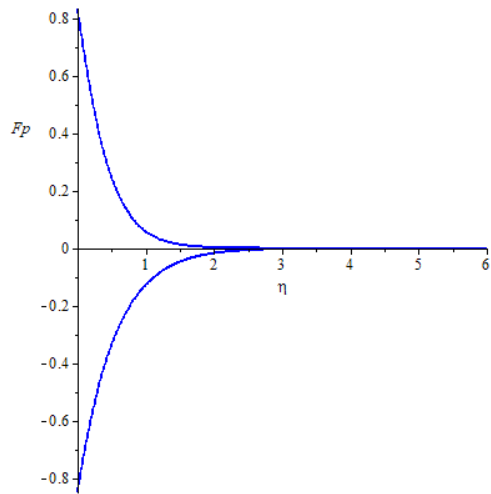
> $W1 := shoot(ODE, IC1, BC2, FNS, [\alpha$
 $= 0.688307076, \psi = 2.933294862,])$:

`"shoot: Step # 1`

`shoot: Parameter values : alpha = .688307076 psi = 2.933294862`
`shoot: Step # 2`

`shoot: Parameter values : alpha = HFloat(0.6882626381903993)`
`psi = HFloat(2.9337283407793278)"`

- > $p1 := \text{odeplot}(S1, [\eta, Fp(\eta)], 0 ..blt1,$
 $\text{numpoints} = 500, \text{color} = \text{blue}) :$
- > $p2 := \text{odeplot}(S1, [\eta, \theta(\eta)], 0 ..blt1,$
 $\text{numpoints} = 500, \text{color} = \text{blue}) :$
- > $\text{display}(p1, p2)$



- > $w1 := \text{odeplot}(W1, [\eta, Fp(\eta)], 0 ..blt2,$
 $\text{numpoints} = 500, \text{color} = \text{red}) :$
- > $w2 := \text{odeplot}(W1, [\eta, \theta(\eta)], 0 ..blt2,$
 $\text{numpoints} = 500, \text{color} = \text{red}) :$
- > $\text{display}(w1, w2)$

