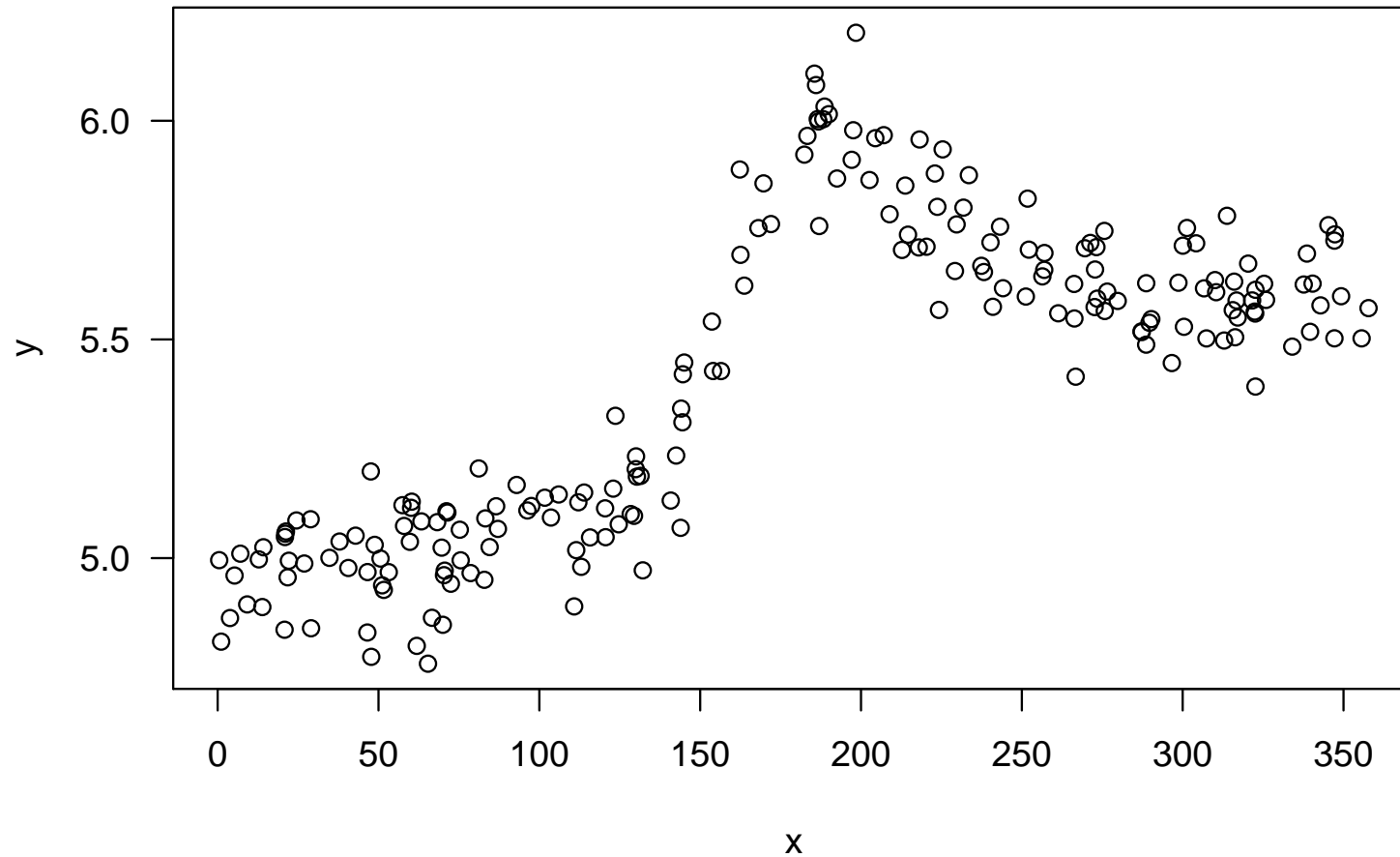


## Splines in AD Model Builder

Anders Nielsen & Arni Magnusson

# How would we deal with this data?



# The data file

```
# noSplineNodes
  25
# nrow
  200
# x y
287.202 5.519
271.283 5.721
140.852 5.132
122.96 5.159
130.066 5.233
71.404 5.104
192.549 5.868
34.749 5.001
355.625 5.502
60.325 5.129
287.276 5.517
213.766 5.852
325.912 5.59
317.106 5.55
357.781 5.572

-- cut ---
```

# The AD Model Builder file

## DATA\_SECTION

```
init_int nSplineNodes
init_int nrow
init_matrix xy(1,nrow,1,2)
vector x(1,nrow)
vector y(1,nrow)
!! x=column(xy,1); y=column(xy,2);
vector nodes(1,nSplineNodes)
!! nodes.fill_seqadd(min(x), (max(x)-min(x))/(nSplineNodes-1));
```

## PARAMETER\_SECTION

```
init_vector yAtNodes(1,nSplineNodes)
init_number logSigma;
sdreport_number sigmasq;
objective_function_value nll;
sdreport_vector pred(1,nrow);
```

## PROCEDURE\_SECTION

```
vcubic_spline_function qs(nodes,yAtNodes); // NOTICE
pred=qs(x);
sigmasq=exp(2*logSigma);
nll=0.5*(nrow*log(2*M_PI*sigmasq)+sum(square(y-pred))/sigmasq);
```

## TOP\_OF\_MAIN\_SECTION

```
gradient_structure::set_NUM_DEPENDENT_VARIABLES(500);
```

# The result

