Cubic Interpolation using R

(v. 2.0)

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http://www.princeton.edu/~otorres/

Cubic interpolation

```
# Preparing the data
mydata = read.csv("http://www.princeton.edu/~otorres/quarterly1.csv", header = TRUE)
head(mydata)
tail(mydata)
# Transforming the date variable 'quarterly' (original form is factor/string)
library(zoo)
# Quarter in year-quarter format
mydata$quarter = as.yearqtr(mydata$quarterly,format="%Yq%q")
# Quarter in year-month-day format
mydata$qvar = as.Date(mydata$quarter)
head(mydata,13)
```

	quarterly	unemp	cpi	interest	gdp	quarter	qvar
1	1957q1	3.933333	27.77667	2.96	NA	1957 Q1	1957-01-01
2	1957q2	4.100000	28.01333	3.00	7.4391565	1957 Q2	1957-04-01
3	1957q3	4.233333	28.26333	3.47	2.9988995	1957 Q3	1957-07-01
4	1957q4	4.933333	28.40000	2.98	-1.3890126	1957 Q4	1957-10-01
5	1958q1	6.300000	28.73667	1.20	-0.9209932	1958 Q1	1958-01-01
6	1958q2	7.366667	28.93000	0.93	3.2106061	1958 Q2	1958-04-01
7	1958q3	7.333334	28.91333	1.76	3.6096158	1958 Q3	1958-07-01
8	1958q4	6.366667	28.94333	2.42	2.9486711	1958 Q4	1958-10-01
9	1959q1	5.833334	28.99333	2.80	1.1829405	1959 Q1	1959-01-01
10	1959q2	5.100000	29.04333	3.39	5.2851181	1959 Q2	1959-04-01
11	1959q3	5.266667	29.19333	3.76	6.3019662	1959 Q3	1959-07-01
12	1959q4	5.600000	29.37000	3.99	1.0160819	1959 Q4	1959-10-01
13	1960q1	5.133333	29.39667	3.84	9.7185040	1960 Q1	1960-01-01

Cubic interpolation

```
# Subsetting to 2000 and over
mydata1 = subset(mydata, quarter>"1999 Q4")

# Creating a daily sequence for the quarterly range
daily = seq(mydata1$qvar[1], tail(mydata1$qvar,1), by="day")
daily
 [1] "2000-01-01" "2000-01-02" "2000-01-03" "2000-01-04" "2000-01-05" "2000-01-06" "2000-01-07" "2000-01-08" "2000-01-09"
 [10] "2000-01-10" "2000-01-11" "2000-01-12" "2000-01-13" "2000-01-14" "2000-01-15" "2000-01-16" "2000-01-17" "2000-01-18"
 [19] "2000-01-19" "2000-01-20" "2000-01-21" .....

# Getting variable of interest
gdp = mydata1[c("qvar","gdp")]
head(gdp)
      qvar        gdp
      2000-01-01  0.5497326
      2000-04-01  0.3442574
      2000-07-01  0.1344515
      2000-10-01  0.6307021
      2001-01-01  0.2835618
      2001-04-01 -1.7037257
```

Cubic interpolation

```
# Cubic interpolation using spline()
gdp2 = data.frame(qvar=daily, gdp2=spline(gdp, method="fmm", xout=daily)$y)
head(gdp2)
```

```
      qvar      gdp2
1 2000-01-01 0.5497326
2 2000-01-02 0.5505888
3 2000-01-03 0.5513483
4 2000-01-04 0.5520121
5 2000-01-05 0.5525809
6 2000-01-06 0.5530559
```

```
# Merging quarterly and daily interpolated data

mydata2 = merge(gdp, gdp2, by="qvar", all=TRUE)
head(mydata2,100)
```

	qvar	gdp	gdp2
1	**2000-01-01**	**0.5497326**	**0.5497326**
2	2000-01-02	NA	0.5505888
3	2000-01-03	NA	0.5513483
4	2000-01-04	NA	0.5520121
5	2000-01-05	NA	0.5525809
6	2000-01-06	NA	0.5530559
7	2000-01-07	NA	0.5534378
8	2000-01-08	NA	0.5537277
9	2000-01-09	NA	0.5539265
10	2000-01-10	NA	0.5540350
11	2000-01-11	NA	0.5540542
12	2000-01-12	NA	0.5539851
13	2000-01-13	NA	0.5538285
==========	==========	==========	==========
87	2000-03-27	NA	0.3647788
88	2000-03-28	NA	0.3607066
89	2000-03-29	NA	0.3566175
90	2000-03-30	NA	0.3525123
91	2000-03-31	NA	0.3483919
92	**2000-04-01**	**0.3442574**	**0.3442574**
93	2000-04-02	NA	0.3401098
94	2000-04-03	NA	0.3359506
95	2000-04-04	NA	0.3317817
96	2000-04-05	NA	0.3276048
97	2000-04-06	NA	0.3234218
98	2000-04-07	NA	0.3192343
99	2000-04-08	NA	0.3150441
100	2000-04-09	NA	0.3108530

References

http://stackoverflow.com/questions/25062408/interpolate-extend-quarterly-to-monthly-series

http://columbiaeconomics.com/2010/01/20/how-economists-convert-quarterly-data-into-monthly-cubic-spline-interpolation/comment-page-1/

http://r.789695.n4.nabble.com/disaggregate-from-monthly-to-daily-time-series-td930098.html