

# Predicciones sobre CoViD-19

**Manuel Febrero-Bande**

Dpt. de Estadística, Análisis Matemático y Optimización  
Univ. de Santiago de Compostela

April 13, 2020



DEPARTAMENTO DE ESTATÍSTICA,  
ANÁLISE MATEMÁTICA E OPTIMIZACIÓN



---

- Predicciones

- Predicciones Fallecidos

# Datos

Número de datos funcionales: 2841

Países/Regiones distintos incorporados: 148

### Predicciones:

▶ España

► Andalucía

► Aragón

► Asturias

► I. Balears

▶ **Canarias**

► **Cantabria**

► **Cataluña**

► **Castilla-La Mancha**

▶ Castilla y León

► C. Valenciana

► Extremadura

▶ País Vasco

► **Galicia**

▶ Madrid

► Murcia

▶ Navarra

► **La Rioja**

► Mod Lineal

▶ Mod NP

► Mod Aditivo

|       | $\sigma_R^2$ |       |       | $\sigma_R^2(rob.)$ |       |       | $r^2$ |       |       |
|-------|--------------|-------|-------|--------------------|-------|-------|-------|-------|-------|
| Horiz | FLM          | NP    | SAM   | FLM                | NP    | SAM   | FLM   | NP    | SAM   |
| H1    | 0.005        | 0.004 | 0.005 | 0.003              | 0.002 | 0.003 | 0.43  | 0.653 | 0.448 |
| H2    | 0.014        | 0.009 | 0.013 | 0.012              | 0.007 | 0.012 | 0.572 | 0.755 | 0.597 |
| H3    | 0.031        | 0.019 | 0.029 | 0.03               | 0.018 | 0.028 | 0.619 | 0.784 | 0.644 |
| H4    | 0.065        | 0.04  | 0.06  | 0.061              | 0.034 | 0.059 | 0.614 | 0.78  | 0.64  |
| H5    | 0.121        | 0.072 | 0.112 | 0.122              | 0.06  | 0.108 | 0.6   | 0.778 | 0.63  |

Último dato: 2020-04-12 21:00 que se publica 2020-04-13 12:00.

## Tabla Previsión Confirmados: Mod. Lineal.

|                      | Last   | H1     | H2     | H3     | H4     | H5     |
|----------------------|--------|--------|--------|--------|--------|--------|
| España               | 169496 | 173493 | 175987 | 178621 | 181131 | 182442 |
| Andalucía            | 10187  | 10409  | 10593  | 10767  | 10949  | 11117  |
| Aragón               | 4187   | 4303   | 4413   | 4526   | 4647   | 4770   |
| Asturias             | 1958   | 2010   | 2064   | 2122   | 2186   | 2251   |
| Islas.Baleares       | 1550   | 1578   | 1608   | 1639   | 1669   | 1700   |
| Canarias             | 1944   | 1979   | 2015   | 2050   | 2084   | 2118   |
| Cantabria            | 1777   | 1818   | 1858   | 1900   | 1946   | 1994   |
| Castilla.La.Mancha   | 14054  | 14466  | 14837  | 15190  | 15540  | 15897  |
| Castilla.y.León      | 12628  | 13134  | 13692  | 14301  | 14963  | 15661  |
| Cataluña             | 34726  | 35688  | 36614  | 37541  | 38482  | 39389  |
| Ceuta                | 95     | 96     | 96     | 95     | 95     | 95     |
| Comunidad.Valenciana | 9060   | 9307   | 9558   | 9828   | 10127  | 10440  |
| Extremadura          | 2658   | 2750   | 2847   | 2959   | 3085   | 3220   |
| Galicia              | 7494   | 7668   | 7805   | 7931   | 8065   | 8189   |
| Madrid               | 47146  | 48074  | 48871  | 49596  | 50249  | 50777  |
| Melilla              | 101    | 103    | 105    | 106    | 107    | 109    |
| Murcia               | 1463   | 1491   | 1519   | 1547   | 1576   | 1606   |
| Navarra              | 4092   | 4216   | 4352   | 4496   | 4649   | 4808   |
| País.Vasco           | 11018  | 11314  | 11623  | 11950  | 12295  | 12661  |
| La.Rioja             | 3358   | 3447   | 3539   | 3631   | 3724   | 3820   |

**Table:** Previsión Confirmados: Mod. Lineal - Horizonte 1 – 5 días.

# Tabla Previsión Confirmados: Mod. No Paramétrico.

|                      | Last   | H1     | H2     | H3     | H4     | H5     |
|----------------------|--------|--------|--------|--------|--------|--------|
| España               | 169496 | 173540 | 177429 | 181523 | 185965 | 190608 |
| Andalucía            | 10187  | 10387  | 10595  | 10803  | 11024  | 11242  |
| Aragón               | 4187   | 4288   | 4389   | 4494   | 4606   | 4720   |
| Asturias             | 1958   | 1993   | 2027   | 2068   | 2115   | 2172   |
| Islas.Baleares       | 1550   | 1570   | 1592   | 1617   | 1647   | 1685   |
| Canarias             | 1944   | 1974   | 2003   | 2037   | 2076   | 2125   |
| Cantabria            | 1777   | 1808   | 1839   | 1876   | 1920   | 1974   |
| Castilla.La.Mancha   | 14054  | 14505  | 14956  | 15416  | 15908  | 16399  |
| Castilla.y.León      | 12628  | 13125  | 13598  | 14104  | 14659  | 15248  |
| Cataluña             | 34726  | 35633  | 36547  | 37478  | 38485  | 39495  |
| Ceuta                | 95     | 98     | 100    | 103    | 106    | 110    |
| Comunidad.Valenciana | 9060   | 9259   | 9447   | 9662   | 9911   | 10205  |
| Extremadura          | 2658   | 2725   | 2793   | 2873   | 2968   | 3084   |
| Galicia              | 7494   | 7657   | 7834   | 8010   | 8200   | 8381   |
| Madrid               | 47146  | 48099  | 49033  | 50001  | 51033  | 52089  |
| Melilla              | 101    | 103    | 105    | 107    | 109    | 112    |
| Murcia               | 1463   | 1484   | 1505   | 1531   | 1560   | 1598   |
| Navarra              | 4092   | 4198   | 4295   | 4403   | 4525   | 4662   |
| País.Vasco           | 11018  | 11280  | 11525  | 11805  | 12125  | 12501  |
| La.Rioja             | 3358   | 3442   | 3520   | 3606   | 3701   | 3806   |

Table: Previsión Confirmados: Mod. No Paramétrico - Horizonte 1 – 5 días.

# Tabla Previsión Confirmados: Mod. Aditivo.

|                      | Last   | H1     | H2     | H3     | H4     | H5     |
|----------------------|--------|--------|--------|--------|--------|--------|
| España               | 169496 | 173814 | 179097 | 184138 | 191731 | 198400 |
| Andalucía            | 10187  | 10399  | 10666  | 10947  | 11362  | 11744  |
| Aragón               | 4187   | 4303   | 4446   | 4593   | 4806   | 4996   |
| Asturias             | 1958   | 2010   | 2089   | 2165   | 2271   | 2365   |
| Islas.Baleares       | 1550   | 1576   | 1606   | 1645   | 1703   | 1762   |
| Canarias             | 1944   | 1976   | 2016   | 2058   | 2125   | 2191   |
| Cantabria            | 1777   | 1818   | 1870   | 1922   | 2005   | 2080   |
| Castilla.La.Mancha   | 14054  | 14453  | 14911  | 15261  | 15704  | 16123  |
| Castilla.y.León      | 12628  | 13165  | 13856  | 14543  | 15441  | 16180  |
| Cataluña             | 34726  | 35699  | 36803  | 37880  | 39397  | 40717  |
| Ceuta                | 95     | 96     | 98     | 98     | 100    | 104    |
| Comunidad.Valenciana | 9060   | 9327   | 9672   | 10050  | 10604  | 11109  |
| Extremadura          | 2658   | 2762   | 2897   | 3048   | 3247   | 3427   |
| Galicia              | 7494   | 7662   | 7859   | 8052   | 8335   | 8590   |
| Madrid               | 47146  | 48013  | 48967  | 49944  | 51459  | 52845  |
| Melilla              | 101    | 103    | 105    | 108    | 111    | 115    |
| Murcia               | 1463   | 1491   | 1529   | 1565   | 1624   | 1679   |
| Navarra              | 4092   | 4218   | 4388   | 4556   | 4791   | 4993   |
| País.Vasco           | 11018  | 11326  | 11746  | 12152  | 12763  | 13286  |
| La.Rioja             | 3358   | 3444   | 3579   | 3689   | 3837   | 3963   |

**Table:** Previsión número de casos confirmados: Mod. Aditivo - Horizonte 1 – 5 días.

# Tabla Ratio Incr. Confirmados: Mod. Lineal.

|                      | Last  | H1    | H2    | H3    | H4    | H5    |
|----------------------|-------|-------|-------|-------|-------|-------|
| España               | 0.027 | 0.024 | 0.038 | 0.054 | 0.069 | 0.076 |
| Andalucía            | 0.024 | 0.022 | 0.040 | 0.057 | 0.075 | 0.091 |
| Aragón               | 0.031 | 0.028 | 0.054 | 0.081 | 0.110 | 0.139 |
| Asturias             | 0.030 | 0.026 | 0.054 | 0.084 | 0.116 | 0.150 |
| Islas.Baleares       | 0.016 | 0.018 | 0.038 | 0.057 | 0.077 | 0.097 |
| Canarias             | 0.016 | 0.018 | 0.037 | 0.055 | 0.072 | 0.089 |
| Cantabria            | 0.023 | 0.023 | 0.046 | 0.069 | 0.095 | 0.122 |
| Castilla.La.Mancha   | 0.029 | 0.029 | 0.056 | 0.081 | 0.106 | 0.131 |
| Castilla.y.León      | 0.046 | 0.040 | 0.084 | 0.132 | 0.185 | 0.240 |
| Cataluña             | 0.029 | 0.028 | 0.054 | 0.081 | 0.108 | 0.134 |
| Ceuta                | 0.021 | 0.012 | 0.012 | 0.001 | 0.000 | 0.000 |
| Comunidad.Valenciana | 0.031 | 0.027 | 0.055 | 0.085 | 0.118 | 0.152 |
| Extremadura          | 0.040 | 0.034 | 0.071 | 0.113 | 0.161 | 0.212 |
| Galicia              | 0.026 | 0.023 | 0.042 | 0.058 | 0.076 | 0.093 |
| Madrid               | 0.018 | 0.020 | 0.037 | 0.052 | 0.066 | 0.077 |
| Melilla              | 0.019 | 0.018 | 0.036 | 0.050 | 0.062 | 0.074 |
| Murcia               | 0.019 | 0.019 | 0.038 | 0.057 | 0.077 | 0.097 |
| Navarra              | 0.033 | 0.030 | 0.064 | 0.099 | 0.136 | 0.175 |
| País.Vasco           | 0.029 | 0.027 | 0.055 | 0.085 | 0.116 | 0.149 |
| La.Rioja             | 0.026 | 0.026 | 0.054 | 0.081 | 0.109 | 0.138 |

Table: Previsión Ratio Incr. Confirmados: Mod. lineal - Horizonte 1 – 5 días.

# Tabla Ratio Incr. Confirmados: Mod. No Paramétrico.

|                      | Last  | H1    | H2    | H3    | H4    | H5    |
|----------------------|-------|-------|-------|-------|-------|-------|
| España               | 0.027 | 0.024 | 0.047 | 0.071 | 0.097 | 0.125 |
| Andalucía            | 0.024 | 0.020 | 0.040 | 0.060 | 0.082 | 0.104 |
| Aragón               | 0.031 | 0.024 | 0.048 | 0.073 | 0.100 | 0.127 |
| Asturias             | 0.030 | 0.018 | 0.035 | 0.056 | 0.080 | 0.109 |
| Islas.Baleares       | 0.016 | 0.013 | 0.027 | 0.043 | 0.063 | 0.087 |
| Canarias             | 0.016 | 0.015 | 0.030 | 0.048 | 0.068 | 0.093 |
| Cantabria            | 0.023 | 0.017 | 0.035 | 0.056 | 0.080 | 0.111 |
| Castilla.La.Mancha   | 0.029 | 0.032 | 0.064 | 0.097 | 0.132 | 0.167 |
| Castilla.y.León      | 0.046 | 0.039 | 0.077 | 0.117 | 0.161 | 0.207 |
| Cataluña             | 0.029 | 0.026 | 0.052 | 0.079 | 0.108 | 0.137 |
| Ceuta                | 0.021 | 0.027 | 0.053 | 0.081 | 0.113 | 0.156 |
| Comunidad.Valenciana | 0.031 | 0.022 | 0.043 | 0.066 | 0.094 | 0.126 |
| Extremadura          | 0.040 | 0.025 | 0.051 | 0.081 | 0.117 | 0.160 |
| Galicia              | 0.026 | 0.022 | 0.045 | 0.069 | 0.094 | 0.118 |
| Madrid               | 0.018 | 0.020 | 0.040 | 0.061 | 0.082 | 0.105 |
| Melilla              | 0.019 | 0.019 | 0.039 | 0.060 | 0.082 | 0.105 |
| Murcia               | 0.019 | 0.014 | 0.029 | 0.046 | 0.067 | 0.092 |
| Navarra              | 0.033 | 0.026 | 0.050 | 0.076 | 0.106 | 0.139 |
| País.Vasco           | 0.029 | 0.024 | 0.046 | 0.071 | 0.100 | 0.135 |
| La.Rioja             | 0.026 | 0.025 | 0.048 | 0.074 | 0.102 | 0.133 |

**Table:** Previsión Ratio Incr. Confirmados: Mod. No Paramétrico - Horizonte 1  
– 5 días.



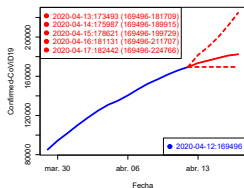
# Tabla Ratio Incr. Confirmados: Mod. Aditivo.

|                      | Last  | H1    | H2    | H3    | H4    | H5    |
|----------------------|-------|-------|-------|-------|-------|-------|
| España               | 0.027 | 0.025 | 0.057 | 0.086 | 0.131 | 0.171 |
| Andalucía            | 0.024 | 0.021 | 0.047 | 0.075 | 0.115 | 0.153 |
| Aragón               | 0.031 | 0.028 | 0.062 | 0.097 | 0.148 | 0.193 |
| Asturias             | 0.030 | 0.027 | 0.067 | 0.106 | 0.160 | 0.208 |
| Islas.Baleares       | 0.016 | 0.017 | 0.036 | 0.061 | 0.099 | 0.137 |
| Canarias             | 0.016 | 0.017 | 0.037 | 0.058 | 0.093 | 0.127 |
| Cantabria            | 0.023 | 0.023 | 0.052 | 0.082 | 0.128 | 0.171 |
| Castilla.La.Mancha   | 0.029 | 0.028 | 0.061 | 0.086 | 0.117 | 0.147 |
| Castilla.y.León      | 0.046 | 0.042 | 0.097 | 0.152 | 0.223 | 0.281 |
| Cataluña             | 0.029 | 0.028 | 0.060 | 0.091 | 0.134 | 0.173 |
| Ceuta                | 0.021 | 0.014 | 0.027 | 0.032 | 0.050 | 0.091 |
| Comunidad.Valenciana | 0.031 | 0.029 | 0.068 | 0.109 | 0.170 | 0.226 |
| Extremadura          | 0.040 | 0.039 | 0.090 | 0.147 | 0.222 | 0.289 |
| Galicia              | 0.026 | 0.022 | 0.049 | 0.074 | 0.112 | 0.146 |
| Madrid               | 0.018 | 0.018 | 0.039 | 0.059 | 0.091 | 0.121 |
| Melilla              | 0.019 | 0.015 | 0.042 | 0.069 | 0.101 | 0.134 |
| Murcia               | 0.019 | 0.019 | 0.045 | 0.070 | 0.110 | 0.148 |
| Navarra              | 0.033 | 0.031 | 0.072 | 0.113 | 0.171 | 0.220 |
| País.Vasco           | 0.029 | 0.028 | 0.066 | 0.103 | 0.158 | 0.206 |
| La.Rioja             | 0.026 | 0.026 | 0.066 | 0.099 | 0.143 | 0.180 |

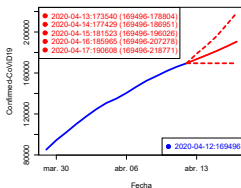
Table: Previsión Ratio Incr. Confirmados: Mod. Aditivo - Horizonte 1 – 5 días.

# Confirmados: España

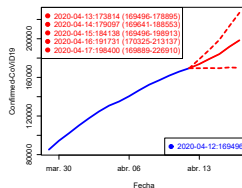
Confirmed:España-FLM



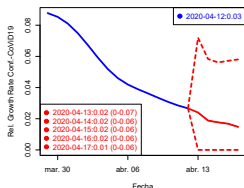
Confirmed:España-NP



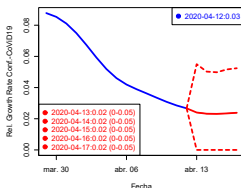
Confirmed:España-SAM



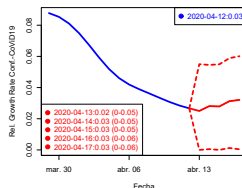
Rel. Growth Rate Conf.:España-FLM



Rel. Growth Rate Conf.:España-NP



Rel. Growth Rate Conf.:España-SAM

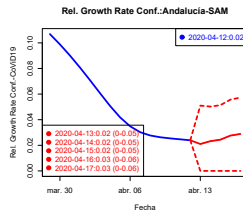
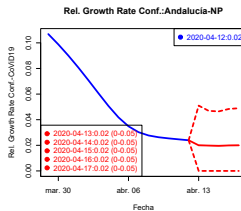
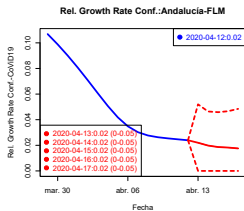
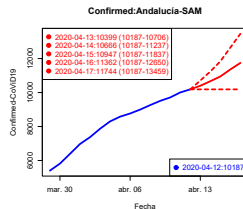
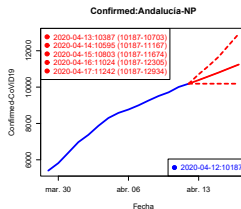
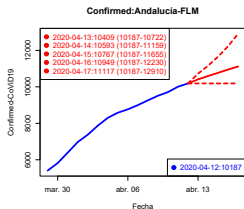


Los valores del Ratio de incremento de H2-H5 están rescalados a H1 para su comparación gráfica.

← Confirmados

← Fallecidos

# Confirmados: Andalucía

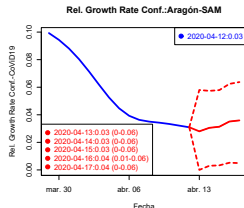
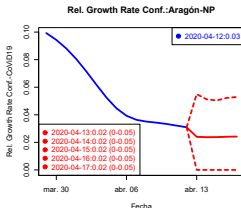
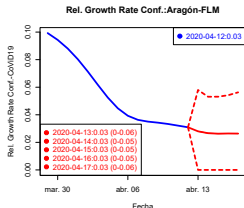
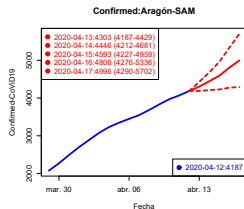
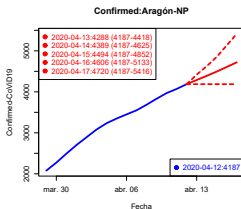
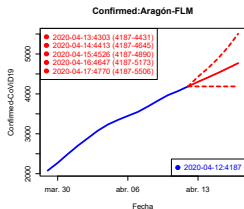


Los valores del Ratio de incremento de H2–H5 están rescalados a H1 para su comparación gráfica.

◀ Confirmados

◀ Fallecidos

## Confirmados: Aragón

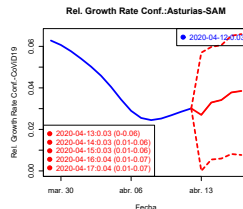
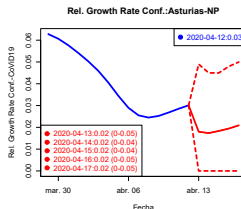
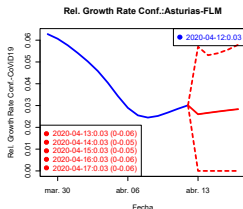
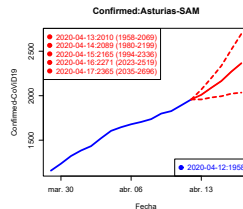
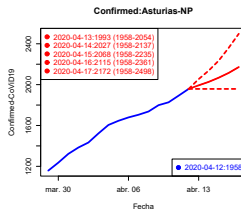
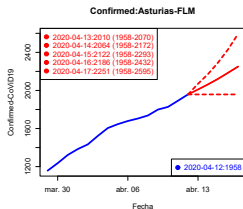


Los valores del Ratio de incremento de H2–H5 están rescalados a H1 para su comparación gráfica.

◀ Confirmados

◀ Fallecidos

# Confirmados: Asturias

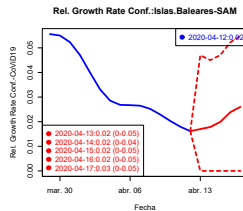
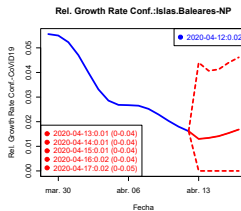
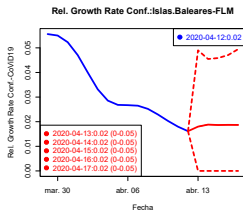
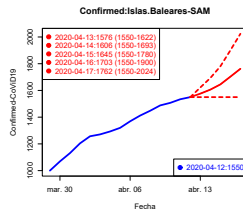
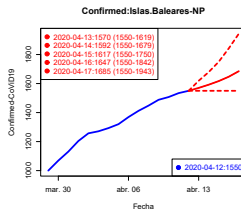
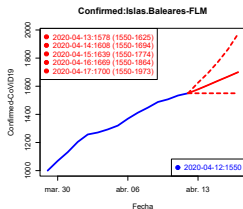


Los valores del Ratio de incremento de H2-H5 están rescalados a H1 para su comparación gráfica.

◀ Confirmados

◀ Fallecidos

# Confirmados: Islas Baleares

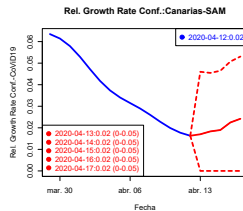
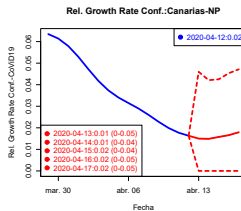
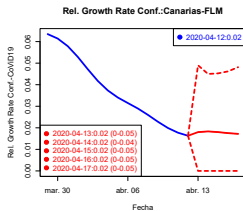
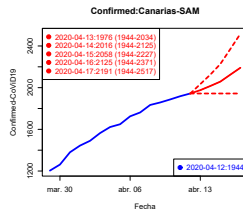
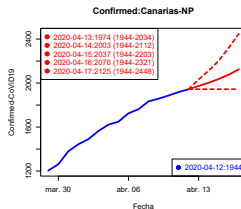
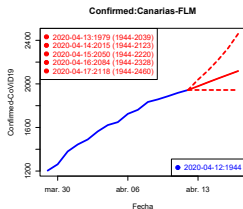


Los valores del Ratio de incremento de H2–H5 están rescalados a H1 para su comparación gráfica.

◀ Confirmados

◀ Fallecidos

## Confirmados: Canarias

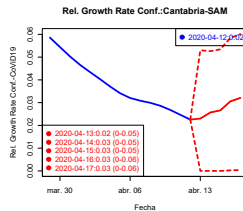
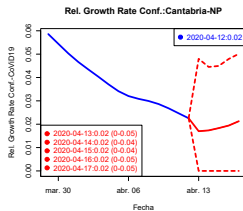
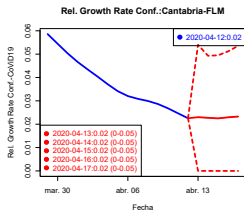
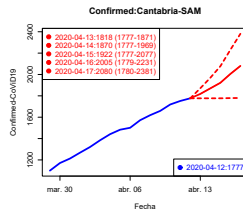
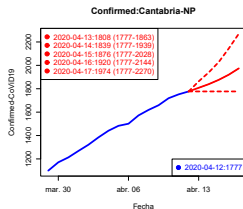
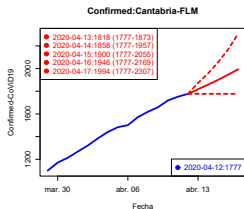


Los valores del Ratio de incremento de H2–H5 están rescalados a H1 para su comparación gráfica.

◀ Confirmados

◀ Fallecidos

# Confirmados: Cantabria



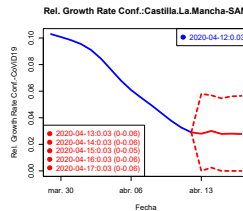
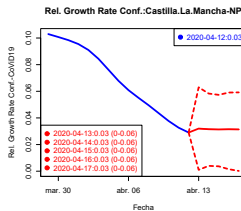
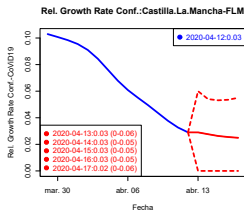
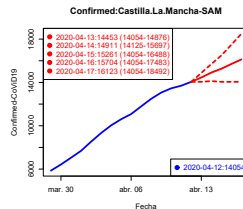
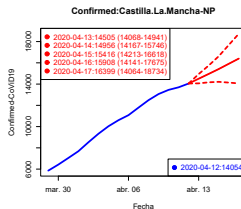
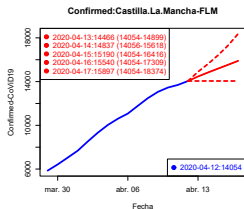
Los valores del Ratio de incremento de H2–H5 están rescalados a H1 para su comparación gráfica.

◀ Confirmados

◀ Fallecidos



# Confirmados: Castilla-La Mancha

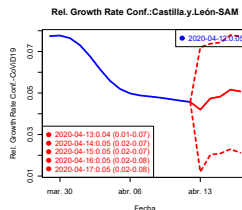
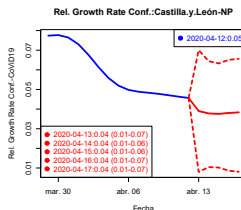
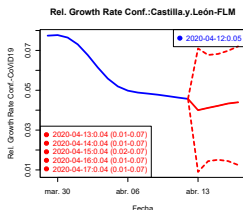
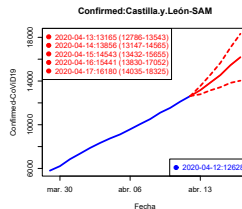
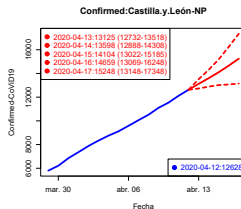
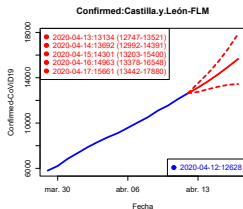


Los valores del Ratio de incremento de H2–H5 están rescalados a H1 para su comparación gráfica.

◀ Confirmados

◀ Fallecidos

# Confirmados: Castilla y León

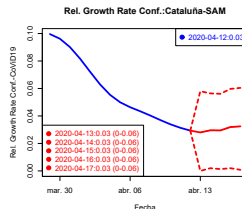
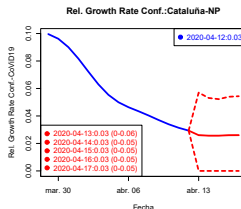
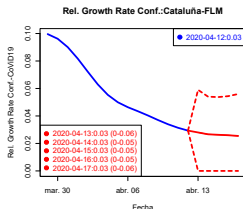
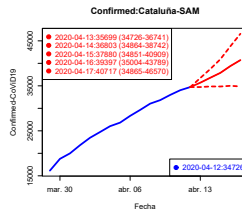
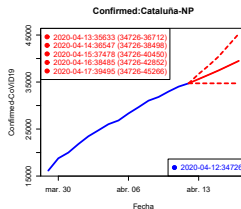
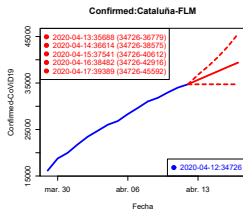


Los valores del Ratio de incremento de H2–H5 están rescalados a H1 para su comparación gráfica.

◀ Confirmados

◀ Fallecidos

# Confirmados: Cataluña

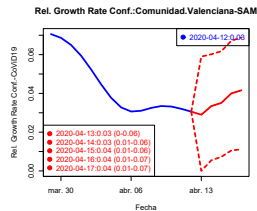
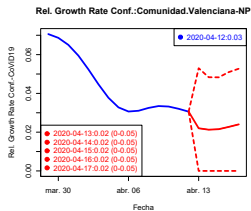
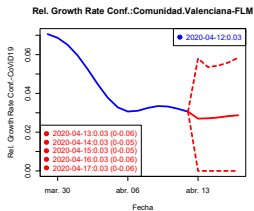
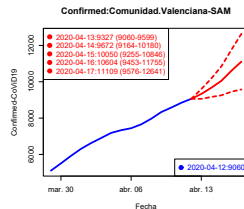
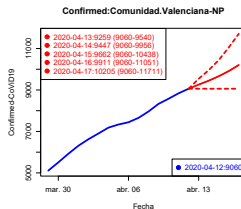
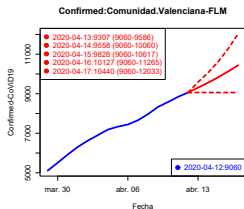


Los valores del Ratio de incremento de H2–H5 están rescalados a H1 para su comparación gráfica.

◀ Confirmados

◀ Fallecidos

# Confirmados: C. Valenciana



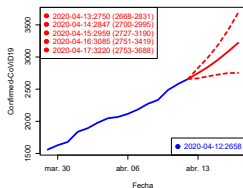
Los valores del Ratio de incremento de H2–H5 están rescalados a H1 para su comparación gráfica.

◀ Confirmados

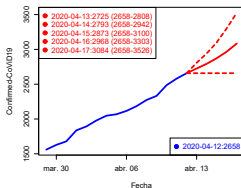
◀ Fallecidos

# Confirmados: Extremadura

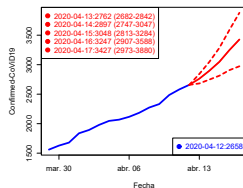
Confirmed:Extremadura-FLM



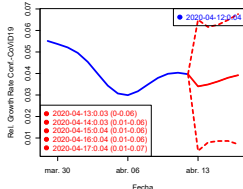
Confirmed:Extremadura-NP



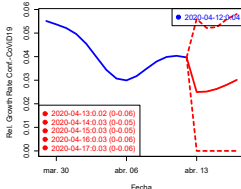
Confirmed:Extremadura-SAM



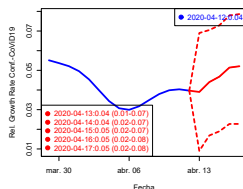
Rel. Growth Rate Conf.:Extremadura-FLM



Rel. Growth Rate Conf.:Extremadura-NP



Rel. Growth Rate Conf.:Extremadura-SAM

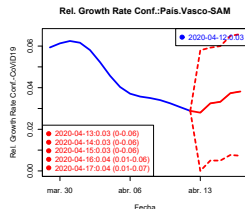
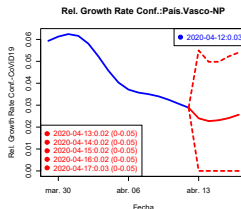
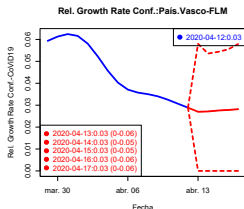
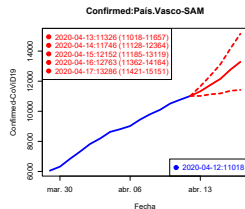
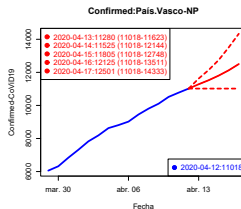
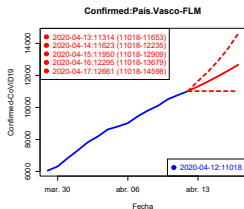


Los valores del Ratio de incremento de H2-H5 están rescalados a H1 para su comparación gráfica.

◀ Confirmados

◀ Fallecidos

## Confirmados: País Vasco

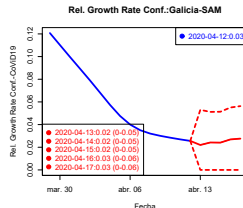
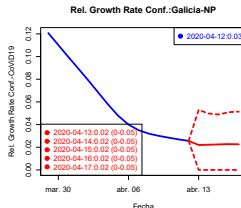
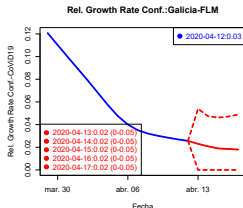
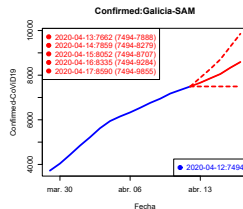
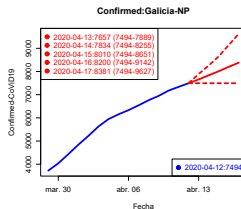
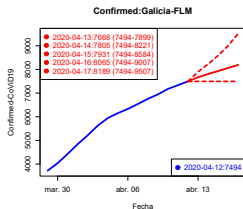


Los valores del Ratio de incremento de H2–H5 están rescalados a H1 para su comparación gráfica.

◀ Confirmados

◀ Fallecidos

# Confirmados: Galicia

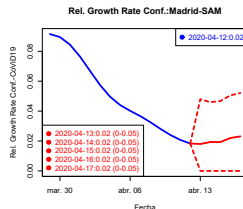
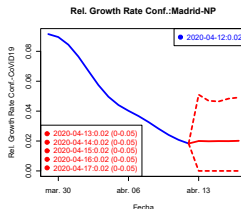
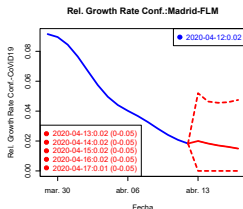
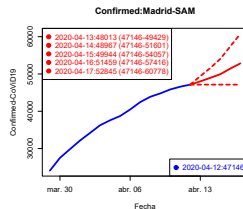
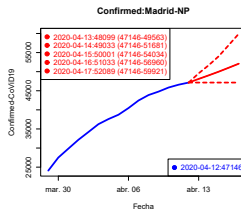
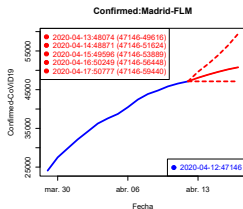


Los valores del Ratio de incremento de H2–H5 están rescalados a H1 para su comparación gráfica.

◀ Confirmados

◀ Fallecidos

# Confirmados: Madrid



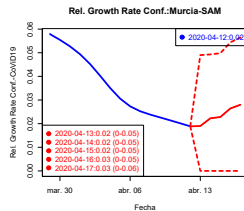
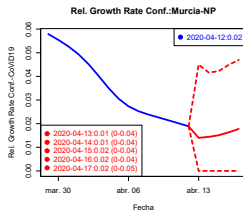
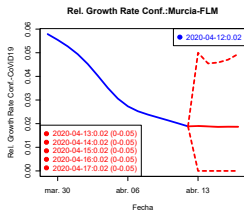
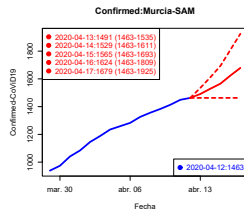
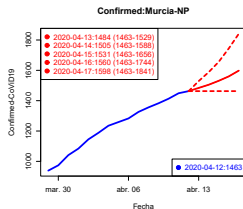
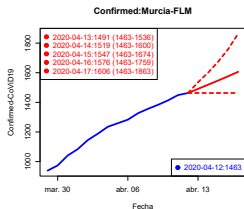
Los valores del Ratio de incremento de H2–H5 están rescalados a H1 para su comparación gráfica.

◀ Confirmados

◀ Fallecidos



## Confirmados: Murcia

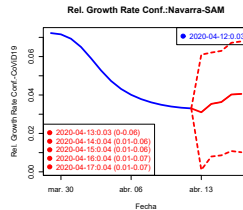
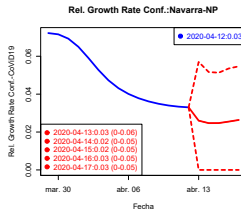
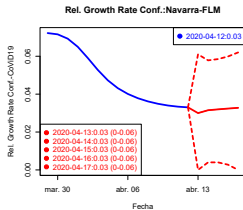
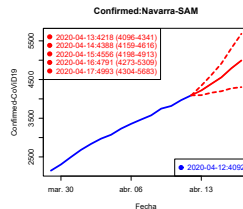
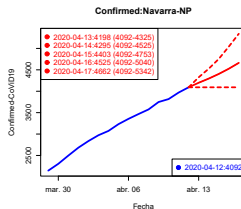
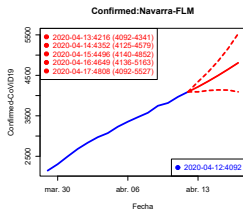


Los valores del Ratio de incremento de H2–H5 están rescalados a H1 para su comparación gráfica.

◀ Confirmados

◀ Fallecidos

# Confirmados: Navarra

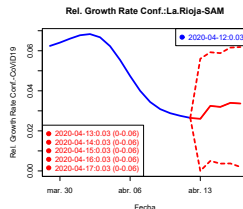
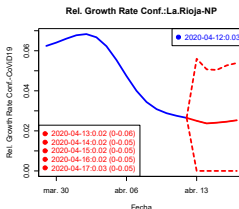
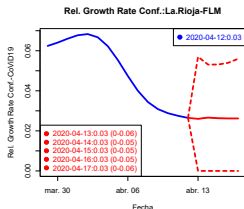
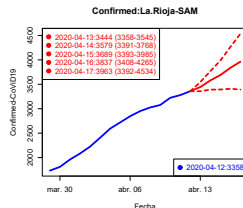
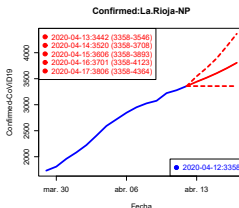
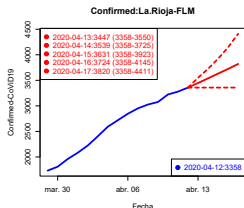


Los valores del Ratio de incremento de H2-H5 están rescalados a H1 para su comparación gráfica.

◀ Confirmados

◀ Fallecidos

# Confirmados: La Rioja



Los valores del Ratio de incremento de H2–H5 están rescalados a H1 para su comparación gráfica.

◀ Confirmados

◀ Fallecidos

# Table of Contents

## 1 Casos Confirmados

- Predicciones

## 2 Fallecidos

- Predicciones Fallecidos

# Modelos para fallecidos por CoViD-19

Número de datos funcionales: 4024

Países/Regiones distintos incorporados: 79

Predicciones:

▶ España

▶ Andalucía

▶ Aragón

▶ Asturias

▶ I. Baleares

▶ Canarias

▶ Cantabria

▶ Castilla-La Mancha

▶ Castilla y León

▶ Cataluña

▶ C. Valenciana

▶ Extremadura

▶ País Vasco

▶ Galicia

▶ Madrid

▶ Murcia

▶ Navarra

▶ La Rioja

▶ Mod Lineal

▶ Mod NP

▶ Mod Aditivo

|       | $\sigma_R^2$ |       |       | $\sigma_R^2(rob.)$ |       |       | $r^2$ |       |       |
|-------|--------------|-------|-------|--------------------|-------|-------|-------|-------|-------|
| Horiz | FLM          | NP    | SAM   | FLM                | NP    | SAM   | FLM   | NP    | SAM   |
| H1    | 0.041        | 0.01  | 0.039 | 0.026              | 0.004 | 0.028 | 0.11  | 0.822 | 0.146 |
| H2    | 0.115        | 0.032 | 0.11  | 0.099              | 0.017 | 0.101 | 0.175 | 0.82  | 0.212 |
| H3    | 0.266        | 0.079 | 0.253 | 0.215              | 0.061 | 0.193 | 0.201 | 0.811 | 0.238 |
| H4    | 0.584        | 0.198 | 0.55  | 0.488              | 0.108 | 0.45  | 0.204 | 0.785 | 0.248 |
| H5    | 1.207        | 0.424 | 1.133 | 0.766              | 0.166 | 0.704 | 0.203 | 0.777 | 0.249 |

# Tabla Previsión Fallecidos: Mod. Lineal.

|                      | Last  | H1    | H2    | H3    | H4    | H5    |
|----------------------|-------|-------|-------|-------|-------|-------|
| España               | 17489 | 17903 | 18307 | 18655 | 18878 | 18993 |
| Andalucía            | 815   | 843   | 872   | 894   | 909   | 915   |
| Aragón               | 464   | 474   | 482   | 485   | 480   | 464   |
| Asturias             | 149   | 155   | 160   | 165   | 169   | 170   |
| Islas.Baleares       | 117   | 119   | 121   | 123   | 121   | 117   |
| Canarias             | 96    | 96    | 96    | 96    | 96    | 96    |
| Cantabria            | 117   | 117   | 117   | 117   | 117   | 117   |
| Castilla.La.Mancha   | 1626  | 1689  | 1754  | 1817  | 1871  | 1919  |
| Castilla.y.León      | 1263  | 1287  | 1306  | 1320  | 1320  | 1303  |
| Cataluña             | 3538  | 3597  | 3645  | 3680  | 3660  | 3599  |
| Ceuta                | 4     | 4     | 4     | 4     | 5     | 5     |
| Comunidad.Valenciana | 876   | 887   | 894   | 898   | 890   | 876   |
| Extremadura          | 321   | 323   | 323   | 321   | 321   | 321   |
| Galicia              | 284   | 290   | 295   | 298   | 295   | 284   |
| Madrid               | 6423  | 6586  | 6762  | 6920  | 7073  | 7244  |
| Melilla              | 2     | 2     | 2     | 2     | 2     | 2     |
| Murcia               | 101   | 101   | 101   | 101   | 101   | 101   |
| Navarra              | 239   | 241   | 243   | 243   | 240   | 239   |
| País.Vasco           | 831   | 854   | 876   | 895   | 909   | 913   |
| La.Rioja             | 223   | 229   | 236   | 241   | 246   | 248   |

Table: Previsión fallecidos: Mod. lineal - Horizonte 1 – 5 días.

# Tabla Previsión Fallecidos: Mod. No Paramétrico.

|                      | Last  | H1    | H2    | H3    | H4    | H5    |
|----------------------|-------|-------|-------|-------|-------|-------|
| España               | 17489 | 18233 | 19206 | 20278 | 22053 | 24259 |
| Andalucía            | 815   | 853   | 905   | 963   | 1064  | 1193  |
| Aragón               | 464   | 487   | 516   | 549   | 602   | 669   |
| Asturias             | 149   | 151   | 155   | 158   | 165   | 174   |
| Islas.Baleares       | 117   | 118   | 120   | 122   | 125   | 130   |
| Canarias             | 96    | 97    | 99    | 102   | 106   | 111   |
| Cantabria            | 117   | 119   | 121   | 123   | 127   | 131   |
| Castilla.La.Mancha   | 1626  | 1731  | 1850  | 1981  | 2145  | 2338  |
| Castilla.y.León      | 1263  | 1326  | 1401  | 1483  | 1599  | 1738  |
| Cataluña             | 3538  | 3723  | 3957  | 4212  | 4606  | 5092  |
| Ceuta                | 4     | 4     | 4     | 5     | 5     | 5     |
| Comunidad.Valenciana | 876   | 896   | 922   | 951   | 1005  | 1071  |
| Extremadura          | 321   | 326   | 332   | 338   | 350   | 365   |
| Galicia              | 284   | 300   | 320   | 342   | 378   | 424   |
| Madrid               | 6423  | 6688  | 7046  | 7444  | 8134  | 9006  |
| Melilla              | 2     | 2     | 2     | 2     | 3     | 3     |
| Murcia               | 101   | 102   | 104   | 106   | 109   | 114   |
| Navarra              | 239   | 246   | 256   | 267   | 285   | 307   |
| País.Vasco           | 831   | 850   | 875   | 903   | 952   | 1012  |
| La.Rioja             | 223   | 230   | 240   | 250   | 267   | 287   |

Table: Previsión fallecidos: Mod. No Paramétrico - Horizonte 1 – 5 días.

# Tabla Previsión Fallecidos: Mod. Aditivo.

|                      | Last  | H1    | H2    | H3    | H4    | H5    |
|----------------------|-------|-------|-------|-------|-------|-------|
| España               | 17489 | 17907 | 19067 | 19787 | 21195 | 22434 |
| Andalucía            | 815   | 840   | 889   | 910   | 972   | 1010  |
| Aragón               | 464   | 470   | 481   | 479   | 499   | 492   |
| Asturias             | 149   | 156   | 169   | 175   | 189   | 198   |
| Islas.Baleares       | 117   | 118   | 122   | 122   | 126   | 123   |
| Canarias             | 96    | 96    | 96    | 96    | 96    | 96    |
| Cantabria            | 117   | 117   | 117   | 117   | 117   | 117   |
| Castilla.La.Mancha   | 1626  | 1703  | 1856  | 1978  | 2160  | 2320  |
| Castilla.y.León      | 1263  | 1286  | 1341  | 1366  | 1434  | 1461  |
| Cataluña             | 3538  | 3581  | 3766  | 3881  | 4077  | 4231  |
| Ceuta                | 4     | 4     | 5     | 5     | 5     | 6     |
| Comunidad.Valenciana | 876   | 880   | 905   | 904   | 929   | 928   |
| Extremadura          | 321   | 321   | 327   | 324   | 328   | 321   |
| Galicia              | 284   | 286   | 292   | 291   | 304   | 301   |
| Madrid               | 6423  | 6595  | 7071  | 7419  | 8086  | 8788  |
| Melilla              | 2     | 2     | 2     | 2     | 3     | 3     |
| Murcia               | 101   | 101   | 101   | 101   | 101   | 101   |
| Navarra              | 239   | 241   | 251   | 255   | 265   | 270   |
| País.Vasco           | 831   | 857   | 910   | 934   | 1003  | 1046  |
| La.Rioja             | 223   | 231   | 245   | 251   | 272   | 284   |

Table: Previsión fallecidos: Mod. Aditivo - Horizonte 1 – 5 días.



# Tabla Ratio Incr. Fallecidos: Mod. Lineal.

|                      | Last  | H1    | H2    | H3    | H4    | H5    |
|----------------------|-------|-------|-------|-------|-------|-------|
| España               | 0.035 | 0.024 | 0.047 | 0.067 | 0.079 | 0.086 |
| Andalucía            | 0.057 | 0.035 | 0.069 | 0.096 | 0.115 | 0.122 |
| Aragón               | 0.049 | 0.022 | 0.038 | 0.046 | 0.034 | 0.000 |
| Asturias             | 0.076 | 0.039 | 0.076 | 0.109 | 0.131 | 0.137 |
| Islas.Baleares       | 0.064 | 0.018 | 0.033 | 0.049 | 0.035 | 0.000 |
| Canarias             | 0.009 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cantabria            | 0.048 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Castilla.La.Mancha   | 0.050 | 0.039 | 0.079 | 0.117 | 0.151 | 0.180 |
| Castilla.y.León      | 0.039 | 0.019 | 0.034 | 0.045 | 0.045 | 0.032 |
| Cataluña             | 0.031 | 0.017 | 0.030 | 0.040 | 0.035 | 0.017 |
| Ceuta                | 0.001 | 0.032 | 0.071 | 0.064 | 0.114 | 0.225 |
| Comunidad.Valenciana | 0.036 | 0.012 | 0.021 | 0.025 | 0.016 | 0.000 |
| Extremadura          | 0.034 | 0.006 | 0.006 | 0.000 | 0.000 | 0.000 |
| Galicia              | 0.052 | 0.021 | 0.038 | 0.049 | 0.037 | 0.000 |
| Madrid               | 0.027 | 0.025 | 0.053 | 0.077 | 0.101 | 0.128 |
| Melilla              | 0.000 | 0.015 | 0.040 | 0.074 | 0.117 | 0.158 |
| Murcia               | 0.038 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Navarra              | 0.029 | 0.010 | 0.015 | 0.016 | 0.002 | 0.000 |
| País.Vasco           | 0.048 | 0.028 | 0.054 | 0.076 | 0.093 | 0.099 |
| La.Rioja             | 0.046 | 0.028 | 0.056 | 0.079 | 0.101 | 0.114 |

Table: Previsión Ratio Incr. Fallecidos: Mod. lineal - Horizonte 1 – 5 días.

# Tabla Ratio Incr. Fallecidos: Mod. No Paramétrico.

|                      | Last  | H1    | H2    | H3    | H4    | H5    |
|----------------------|-------|-------|-------|-------|-------|-------|
| España               | 0.035 | 0.043 | 0.098 | 0.159 | 0.261 | 0.387 |
| Andalucía            | 0.057 | 0.046 | 0.111 | 0.181 | 0.305 | 0.464 |
| Aragón               | 0.049 | 0.049 | 0.113 | 0.183 | 0.297 | 0.441 |
| Asturias             | 0.076 | 0.016 | 0.039 | 0.063 | 0.109 | 0.167 |
| Islas.Baleares       | 0.064 | 0.011 | 0.025 | 0.041 | 0.070 | 0.106 |
| Canarias             | 0.009 | 0.015 | 0.035 | 0.058 | 0.101 | 0.154 |
| Cantabria            | 0.048 | 0.013 | 0.030 | 0.048 | 0.082 | 0.123 |
| Castilla.La.Mancha   | 0.050 | 0.064 | 0.138 | 0.218 | 0.319 | 0.438 |
| Castilla.y.León      | 0.039 | 0.050 | 0.109 | 0.174 | 0.266 | 0.375 |
| Cataluña             | 0.031 | 0.052 | 0.118 | 0.191 | 0.302 | 0.439 |
| Ceuta                | 0.001 | 0.036 | 0.075 | 0.102 | 0.146 | 0.200 |
| Comunidad.Valenciana | 0.036 | 0.022 | 0.053 | 0.085 | 0.147 | 0.222 |
| Extremadura          | 0.034 | 0.015 | 0.034 | 0.054 | 0.091 | 0.136 |
| Galicia              | 0.052 | 0.054 | 0.127 | 0.205 | 0.331 | 0.492 |
| Madrid               | 0.027 | 0.041 | 0.097 | 0.159 | 0.266 | 0.402 |
| Melilla              | 0.000 | 0.040 | 0.092 | 0.155 | 0.253 | 0.379 |
| Murcia               | 0.038 | 0.012 | 0.029 | 0.047 | 0.081 | 0.123 |
| Navarra              | 0.029 | 0.031 | 0.071 | 0.115 | 0.191 | 0.284 |
| País.Vasco           | 0.048 | 0.023 | 0.053 | 0.087 | 0.145 | 0.217 |
| La.Rioja             | 0.046 | 0.033 | 0.074 | 0.122 | 0.195 | 0.286 |

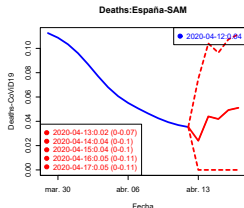
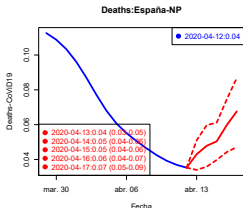
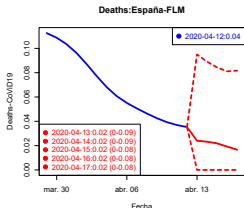
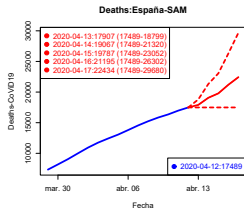
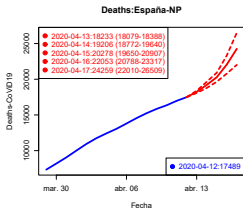
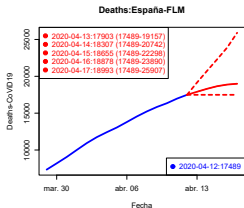
**Table:** Previsión Ratio Incr. Fallecidos: Mod. No Paramétrico - Horizonte 1 – 5 días.

# Tabla Ratio Incr. Fallecidos: Mod. Aditivo.

|                      | Last  | H1    | H2    | H3    | H4    | H5    |
|----------------------|-------|-------|-------|-------|-------|-------|
| España               | 0.035 | 0.024 | 0.090 | 0.131 | 0.212 | 0.283 |
| Andalucía            | 0.057 | 0.030 | 0.091 | 0.116 | 0.193 | 0.239 |
| Aragón               | 0.049 | 0.013 | 0.036 | 0.033 | 0.076 | 0.060 |
| Asturias             | 0.076 | 0.047 | 0.132 | 0.173 | 0.266 | 0.327 |
| Islas.Baleares       | 0.064 | 0.012 | 0.042 | 0.046 | 0.076 | 0.050 |
| Canarias             | 0.009 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cantabria            | 0.048 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Castilla.La.Mancha   | 0.050 | 0.047 | 0.141 | 0.216 | 0.328 | 0.427 |
| Castilla.y.León      | 0.039 | 0.018 | 0.062 | 0.081 | 0.135 | 0.157 |
| Cataluña             | 0.031 | 0.012 | 0.065 | 0.097 | 0.152 | 0.196 |
| Ceuta                | 0.001 | 0.059 | 0.153 | 0.197 | 0.162 | 0.359 |
| Comunidad.Valenciana | 0.036 | 0.004 | 0.033 | 0.032 | 0.060 | 0.059 |
| Extremadura          | 0.034 | 0.000 | 0.018 | 0.010 | 0.022 | 0.000 |
| Galicia              | 0.052 | 0.007 | 0.027 | 0.025 | 0.071 | 0.061 |
| Madrid               | 0.027 | 0.027 | 0.101 | 0.155 | 0.259 | 0.368 |
| Melilla              | 0.000 | 0.013 | 0.081 | 0.124 | 0.267 | 0.411 |
| Murcia               | 0.038 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Navarra              | 0.029 | 0.008 | 0.048 | 0.065 | 0.109 | 0.131 |
| País.Vasco           | 0.048 | 0.032 | 0.095 | 0.124 | 0.206 | 0.258 |
| La.Rioja             | 0.046 | 0.034 | 0.099 | 0.127 | 0.220 | 0.274 |

Table: Previsión Ratio Incr. Fallecidos: Mod. Aditivo - Horizonte 1 – 5 días.

## Fallecidos: España

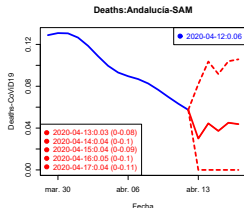
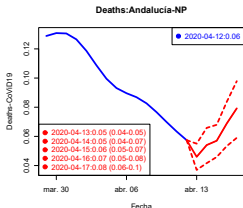
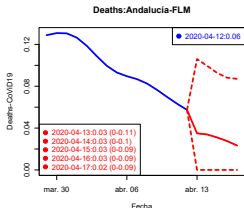
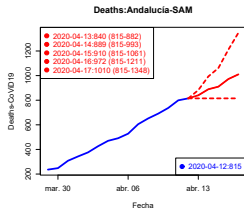
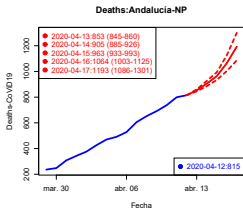
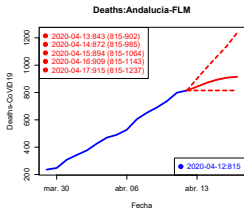


Los valores del Ratio de incremento de H2–H5 están rescalados a H1 para su comparación gráfica.

◀ Confirmados

◀ Fallecidos

## Fallecidos: Andalucía

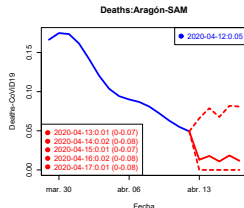
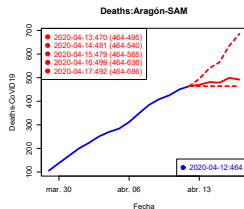


Los valores del Ratio de incremento de H2–H5 están rescalados a H1 para su comparación gráfica.

◀ Confirmados

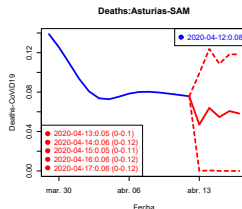
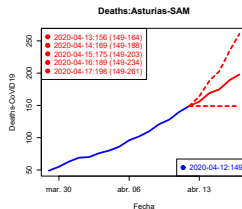
◀ Fallecidos

---



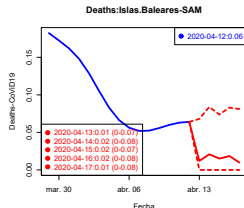
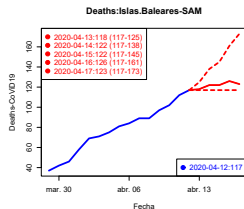
◀ Confirmados    ◀ Fallecidos

---



◀ Confirmados    ◀ Fallecidos

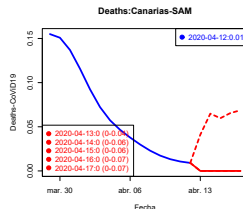
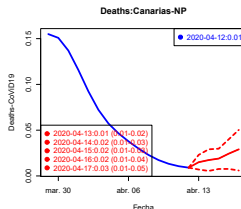
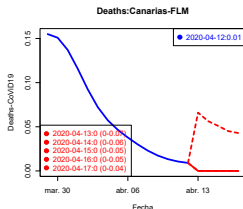
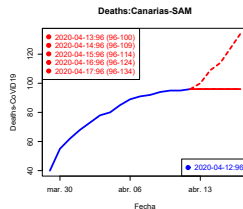
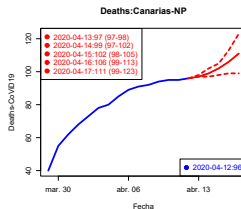
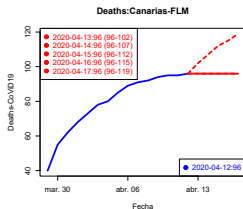
---



◀ Confirmados    ◀ Fallecidos



## Fallecidos: Canarias

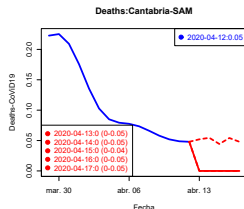
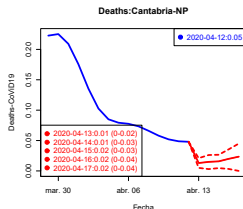
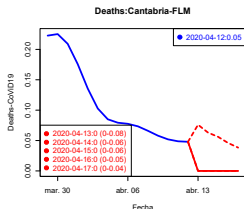
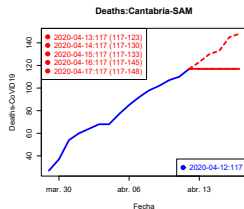
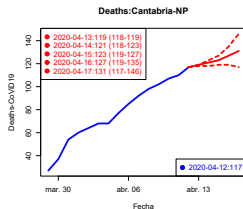
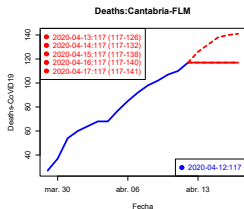


Los valores del Ratio de incremento de H2–H5 están rescalados a H1 para su comparación gráfica.

◀ Confirmados

◀ Fallecidos

## Fallecidos: Cantabria

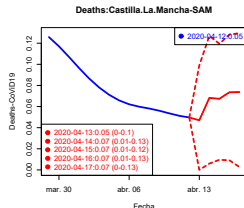
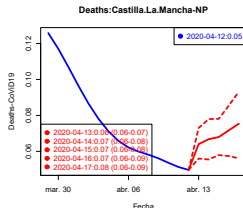
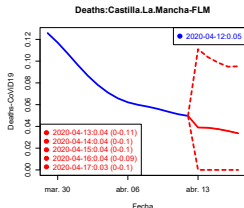
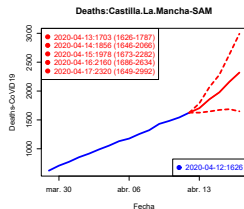
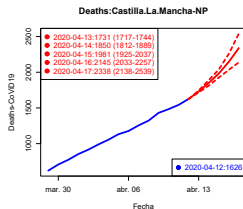
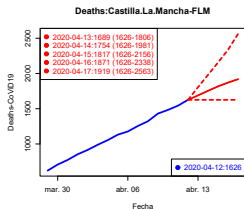


Los valores del Ratio de incremento de H2–H5 están rescalados a H1 para su comparación gráfica.

◀ Confirmados

◀ Fallecidos

## Fallecidos: Castilla-La Mancha



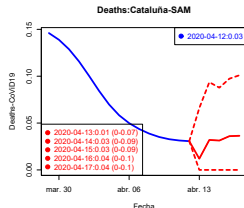
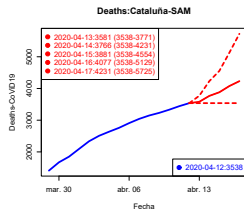
Los valores del Ratio de incremento de H2–H5 están rescalados a H1 para su comparación gráfica.

◀ Confirmados

◀ Fallecidos



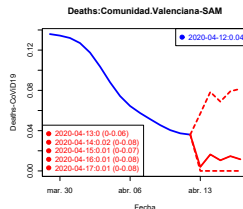
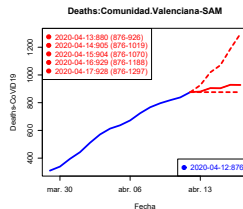
---



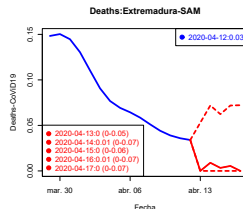
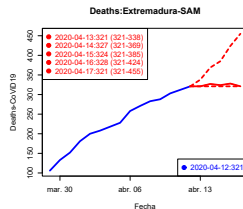
◀ Confirmados    ▶ Fallecidos

Los valores del Ratio de incremento de H2-H5 están rescalados a H1 para su comparación gráfica.

◀ Fallecidos

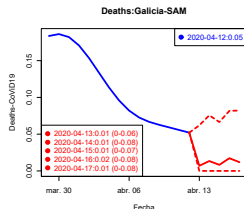
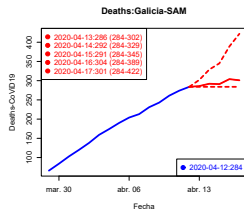


---



◀ Confirmados    ◀ Fallecidos

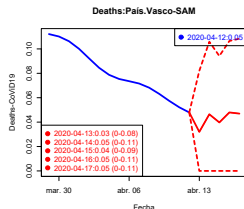
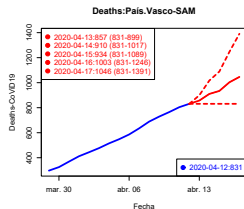
---



◀ Confirmados    ◀ Fallecidos



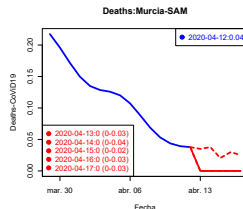
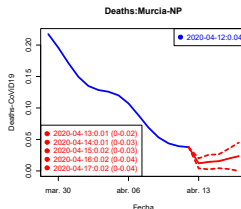
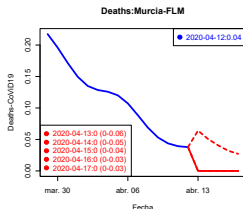
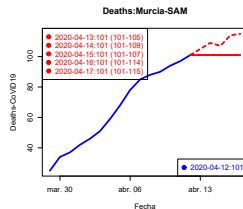
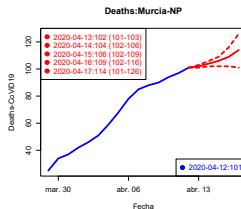
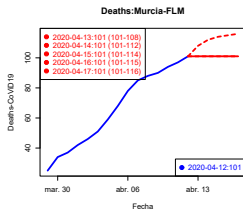
---



◀ Confirmados    ◀ Fallecidos

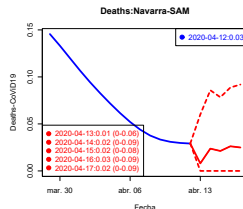
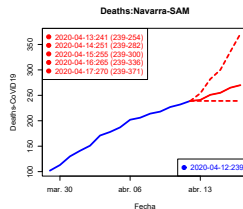


## Fallecidos: Murcia



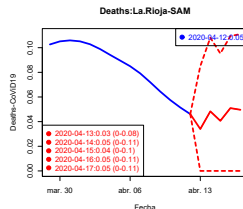
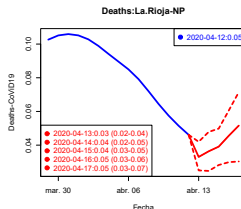
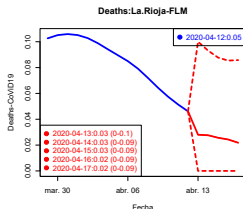
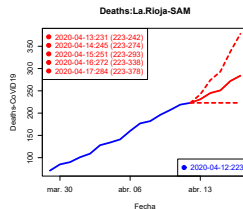
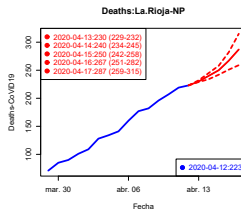
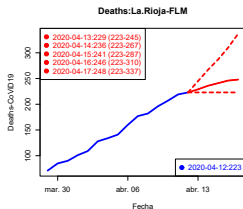
Los valores del Ratio de incremento de H2–H5 están rescalados a H1 para su comparación gráfica.

---



◀ Confirmados    ◀ Fallecidos

## Fallecidos: La Rioja



Los valores del Ratio de incremento de H2–H5 están rescalados a H1 para su comparación gráfica.

◀ Confirmados

◀ Fallecidos

# Breve descripción del Modelo de predicción

Objetivo: Predecir ratio de incremento de casos confirmados a 1, 2, o 3 días:  $r^{(k)}(t) = \frac{x_{t+k} - x_t}{x_t + 1}$

Información usada: Pasado de esta variable suavizado (retardo 1) durante los últimos 15 días:

$$R^{(1)} = \{r^{(1)}(-14), \dots, r^{(1)}(0)\}.$$

Datos para alimentar el modelo: [https://github.com/CSSEGISandData/COVID-19/tree/master/csse\\_covid\\_19\\_data/csse\\_covid\\_19\\_time\\_series/](https://github.com/CSSEGISandData/COVID-19/tree/master/csse_covid_19_data/csse_covid_19_time_series/). Algunas series de tiempo (como el Diamond Princess) son filtrados por inconsistencia, presunta falta de veracidad o por anormalmente valores bajos. En la predicción final se reconstruye el número de casos esperado. Se construyen tres modelos funcionales de la regresión general:  $r^{(k)}(0) = f(R^{(1)}) + \epsilon$  donde la diferencia radica en la forma de la función  $f$

- Lineal:  $f(R^{(1)}) = \int_{-14}^0 R^{(1)}(t)\beta(t)dt$
- NP:  $f$  es una estimación no paramétrica tipo núcleo.
- SAM:  $f$  es una combinación aditiva de funciones suaves de las componentes principales funcionales.

Para el objetivo de predecir el ratio de incremento de fallecidos, se usa además del pasado de la propia variable, el ratio de incremento pasado de casos confirmados.