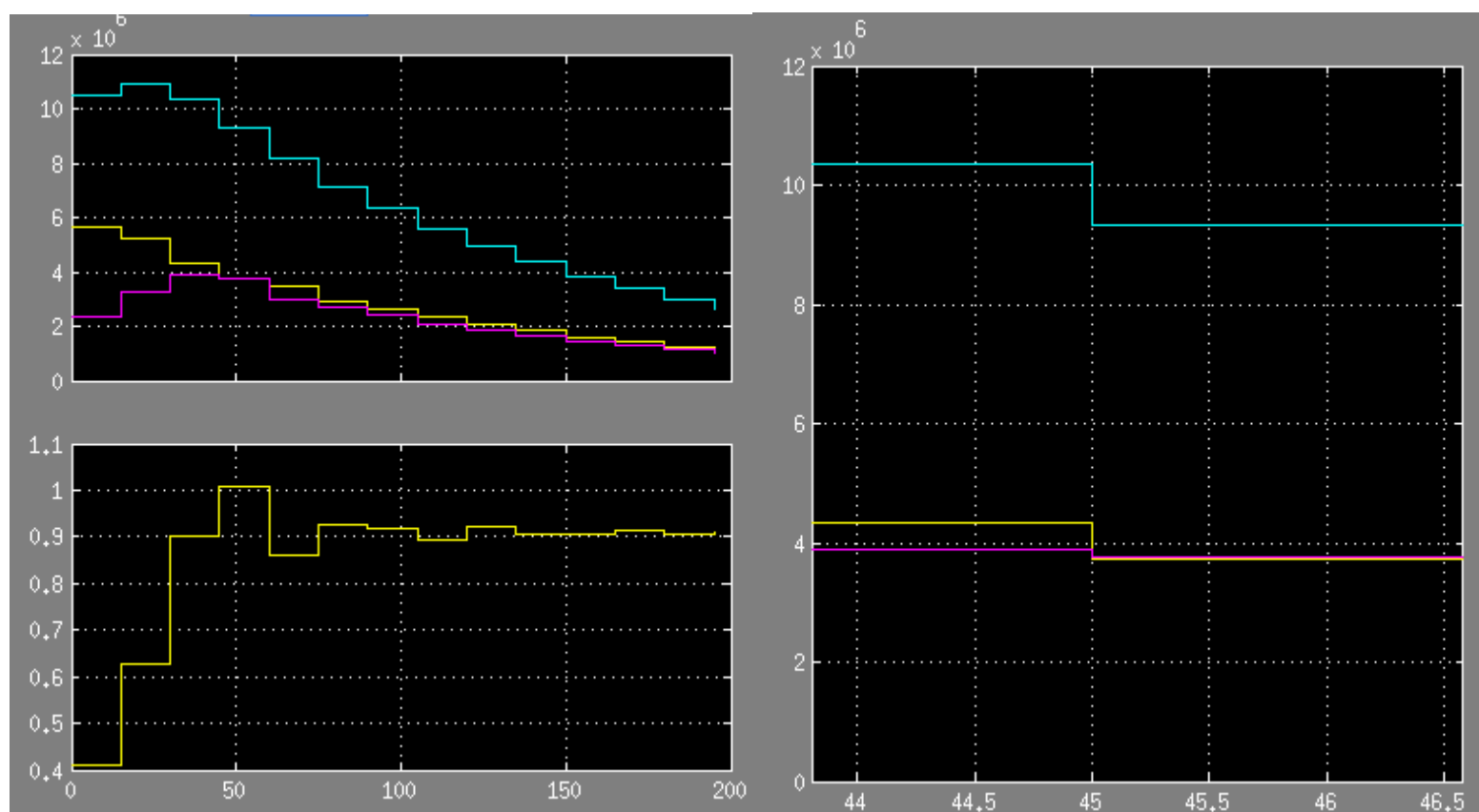


## Lesly model applied on problem ageing of pupulation in Czech Republic

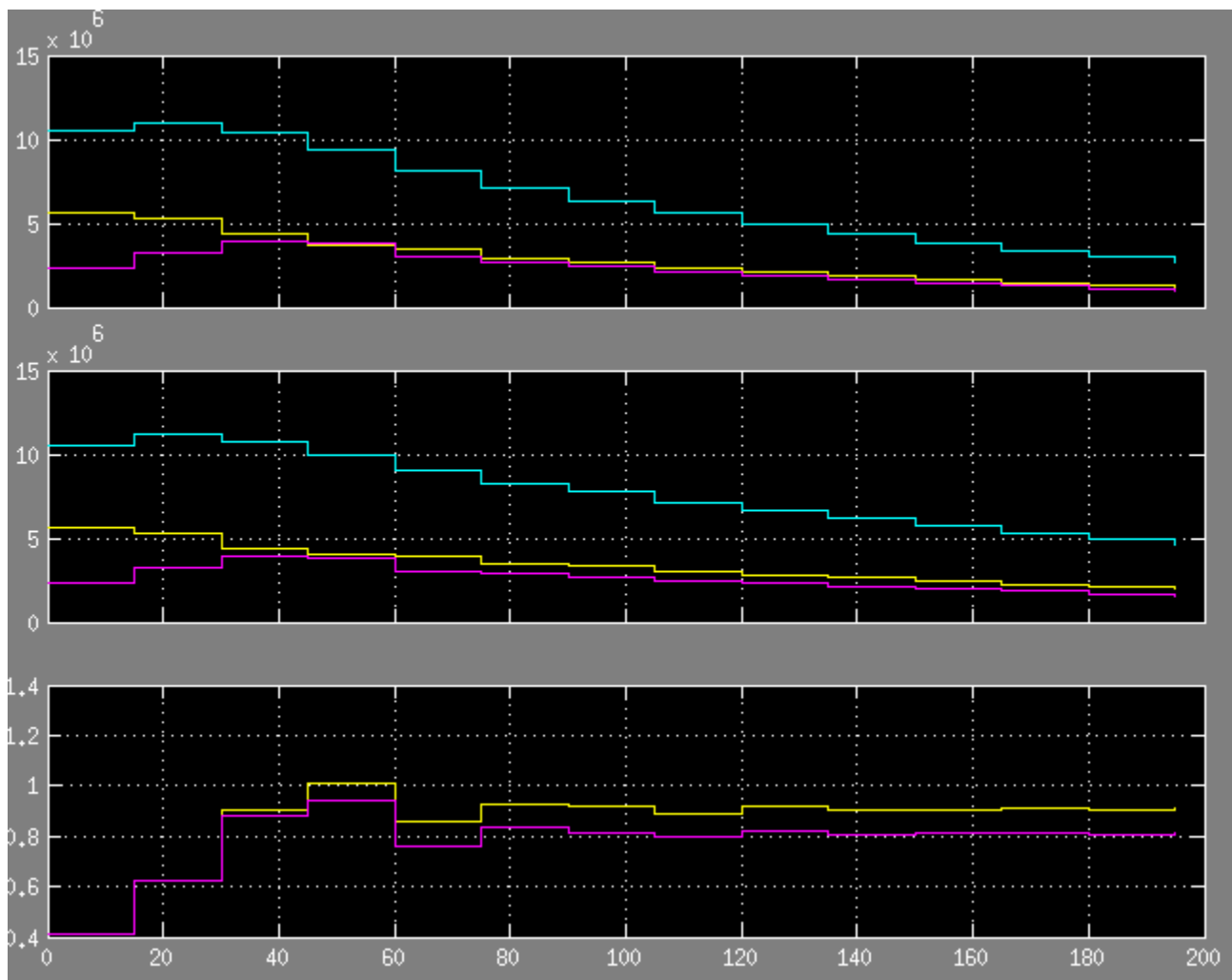
Symbol	Importance	Value	Units	
$X_1...X_7$ - age groups	<b>population of different age groups</b>	init. values: $X_1=1494370$ $X_2=2075652$ $X_3=2474329$ $X_4=2142379$ $X_5=1626214$ $X_6=665283$ $X_7=28586$	ind	Var.
$K_1...K_6$ - death rate	Average annual death rate per 1,000 individuals of the age group	$K_1=0,822164$ $K_2=0,465078$ $K_3=1,16375$ $K_4=5,48891$ $K_5=21,34731$ $K_6=102,3956$	-	Parameters
$B_1...B_3$ - birth rate	Number of children per 1,000 individuals of the class for the year	$B_1=26,67422$ $B_2=23,029775$ $B_3=0,0380419$	-	

From the figure 1 we can see that according to our model peak in ratio between pensioners and workers will be in 45 years, when pensioners even outnumber workers. After 15 years (that we have as one step interval in our model) number of pensioners will decrease but still stay at relatively high ration to number of workers. Plot with single yellow line shows change of this ratio.

**Figure 1:** blue line - all population, yellow - number of workers, purple - number of pensioners



**figure 2:** upper plot - unmodified model, middle - modified, bottom - ratio pensioners/workers from both models



From figure 2 which comprise two simulations: the first one has been already described above and the second with increased to one quarter birth rate. On the first plot of the figure are result of the first simulation. In contrary to it on the second plot due to increased birth rate population almost reach 10 million individuals in 60 years. Also birthrate contributed in such a way that number of pensioners would never equal or more that number of workers with peak value of ratio 0.93. But still in 45 years would be the highest number of pensioners.

Rate wages to pension in 45 years

Average wages in 2010: 29.951 with annual grows rate 1.7 %

Average pension is 10.396 with inflation coefficient 1.4 %

$(10.396 * (1 + 0.014)^{45})$  - average pension in 45 years

$(23.951 * (1 + 0.017)^{45})$  - average salary in 45 years

number of workers in millions

in unmodified model 3.7386, in modified 4.0152

number of pensioners in millions 3.7671

$(10.396 * (1 + 0.014)^{45}) * 3.7671 / [(23.951 * (1 + 0.017)^{45}) * 3.7386] = 0.3829$  in unmodified

$(10.396 * (1 + 0.014)^{45}) * 3.7671 / [(23.951 * (1 + 0.017)^{45}) * 4.0152] = 0.3565$  in modified