KTY81/110

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# KTY81/110 - Temperature (C) as a function of resistance, ignoring the part above 130C
data = [[490, -55], [515, -50], [567, -40], [624, -30], [684, -20], [747, -10], [815, 0], [886,
10], [961, 20], [1000, 25], [1040, 30], [1122, 40], [1209, 50], [1299, 60], [1392, 70], [1490,
80], [1591, 90], [1696, 100], [1805, 110], [1915, 120], [1970, 125], [2023, 130]]

# Determine coefficients of polynomial
var('a, b, c, d, R')
model(R) = a * (ln(R))^3 + b * (ln(R))^2 + c * ln(R) + d
fit = find_fit(data, model)
a0 = fit[0].rhs()
b0 = fit[1].rhs()
c0 = fit[2].rhs()
d0 = fit[3].rhs()
print 'Calculated parameters: {}'.format(fit)

# Plot results
p1 = plot(a0 * (ln(R))^3 + b0 * (ln(R))^2 + c0 * ln(R) + d0, (R, 490,
2023),rgbcolor=Color('red'))
p2 = line(data, rgbcolor=Color('green'), linestyle="--", thickness=3)
p3 = line([[490,-55],[2023, 130]], linestyle="--", rgbcolor=Color('blue'))
show(p1+p2+p3)

# Determine deviation between specified and calculated temperature
Tcalc = [a0 * (ln(R).n())^3 + b0 * (ln(R).n())^2 + c0 * ln(R).n() + d0 for R in [data[i][0] for
i in [0..21]]]
Terr = [abs(data[i][1] - Tcalc[i]) for i in [0..21]]
print 'Max (abs) error is : {0:.4} C'.format(max(Terr))
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Calculated parameters: [a == 7.589469715260443, b ==
-131.58389463236767, c == 858.1123693355288, d ==
-2125.5103020517286]
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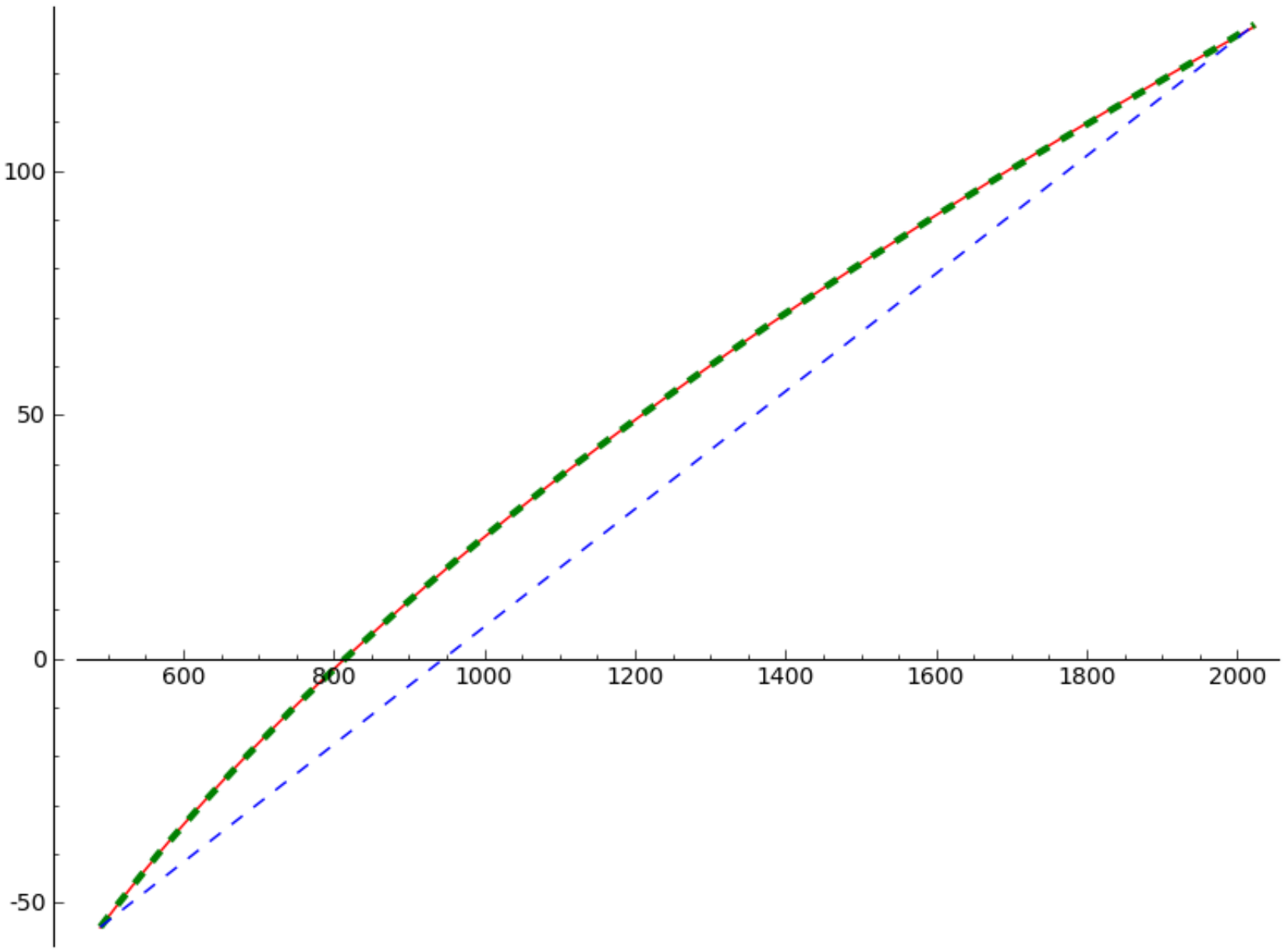


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Max (abs) error is : 0.40 C
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