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(*The following Notebook gives the values
 of coefficients of Pade's Aprroximation for P[3,4]*)
F[x_] = Series[Exp[x], {x, 0, 7}] // Normal; (*Making of three series F, A and B*)
A[x_] = Sum[a[n] x^n, {n, 0, 3}];
B[x_] = 1 + Sum[b[m] x^m, {m, 1, 4}];

diff0[x_] = F[x] - A[x] / B[x];
(*The following block calculates the differentiation and find
  the corresponding coefficients around x = 0*)
a0 = Solve[diff0[0] == 0, a[0]][[1]] (*solving F(0) - R(0) = 0*)
diff0[x_] = diff0[x] /. a0; (*Storing the value of a0*)

(*The above block is repeated to get all the coefficient relations,
further we can get all values using back substituion or analytically*)
diff1[x_] = D[diff0[x], x];
a1 = Solve[diff1[0] == 0, a[1]][[1]]
diff1[x_] = diff1[x] /. a1;

diff2[x_] = D[diff1[x], x];
a2 = Solve[diff2[0] == 0, a[2]][[1]]
diff2[x_] = diff2[x] /. a2;

diff3[x_] = D[diff2[x], x];
a3 = Solve[diff3[0] == 0, a[3]][[1]]
diff3[x_] = diff3[x] /. a3;

diff4[x_] = D[diff3[x], x];
b1 = Solve[diff4[0] == 0, b[1]][[1]]
diff4[x_] = diff4[x] /. b1;

diff5[x_] = D[diff4[x], x];
b2 = Solve[diff5[0] == 0, b[2]][[1]]
diff5[x_] = diff5[x] /. b2;

diff6[x_] = D[diff5[x], x];
b3 = Solve[diff6[0] == 0, b[3]][[1]]
diff6[x_] = diff6[x] /. b3;

diff7[x_] = D[diff6[x], x];
b4 = Solve[diff7[0] == 0, b[4]][[1]]
diff7[x_] = diff7[x] /. b4;
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Out[114]=

$$\{a[0] \to 1\}$$

Out[117]=

$$\{a[1] \to 1 + b[1]\}$$

Out[120]=

$$\left\{a[2] \to \frac{1}{2}\,(1 + 2\,b[1] + 2\,b[2])\right\}$$

Out[123]=

$$\left\{a[3] \to \frac{1}{6}\,(1 + 3\,b[1] + 6\,b[2] + 6\,b[3])\right\}$$

Out[126]=

$$\left\{b[1] \to \frac{1}{4}\,(-1 - 12\,b[2] - 24\,b[3] - 24\,b[4])\right\}$$

Out[129]=

$$\left\{b[2] \to \frac{1}{20}\,(1 - 120\,b[3] - 360\,b[4])\right\}$$

Out[132]=

$$\left\{b[3] \to \frac{1}{120}\,(-1 - 1080\,b[4])\right\}$$

Out[135]=

$$\left\{b[4] \to \frac{1}{840}\right\}$$

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(*Same process as above for P[2,5]*)
F[x_] = Series[Exp[x], {x, 0, 7}] // Normal;
A[x_] = Sum[a[n] x^n, {n, 0, 2}];
B[x_] = 1 + Sum[b[m] x^m, {m, 1, 5}];

diff0[x_] = F[x] - A[x] / B[x];
a0 = Solve[diff0[0] == 0, a[0]][[1]]
diff0[x_] = diff0[x] /. a0;

diff1[x_] = D[diff0[x], x];
a1 = Solve[diff1[0] == 0, a[1]][[1]]
diff1[x_] = diff1[x] /. a1;

diff2[x_] = D[diff1[x], x];
a2 = Solve[diff2[0] == 0, a[2]][[1]]
diff2[x_] = diff2[x] /. a2;

diff3[x_] = D[diff2[x], x];
b1 = Solve[diff3[0] == 0, b[1]][[1]]
diff3[x_] = diff3[x] /. b1;

diff4[x_] = D[diff3[x], x];
b2 = Solve[diff4[0] == 0, b[2]][[1]]
diff4[x_] = diff4[x] /. b2;

diff5[x_] = D[diff4[x], x];
b3 = Solve[diff5[0] == 0, b[3]][[1]]
diff5[x_] = diff5[x] /. b3;

diff6[x_] = D[diff5[x], x];
b4 = Solve[diff6[0] == 0, b[4]][[1]]
diff6[x_] = diff6[x] /. b4;

diff7[x_] = D[diff6[x], x];
b5 = Solve[diff7[0] == 0, b[5]][[1]]
diff7[x_] = diff7[x] /. b5;
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Out[141]=

$$\{a[0] \to 1\}$$

Out[144]=

$$\{a[1] \to 1 + b[1]\}$$

Out[147]=

$$\left\{a[2] \to \frac{1}{2}\,(1 + 2\,b[1] + 2\,b[2])\right\}$$

Out[150]=

$$\left\{b[1] \to \frac{1}{3}\,(-1-6\,b[2]-6\,b[3])\right\}$$

Out[153]=

$$\left\{b[2] \to \frac{1}{12}\,(1-48\,b[3]-72\,b[4])\right\}$$

Out[156]=

$$\left\{b[3] \to \frac{1}{60}\,(-1-360\,b[4]-720\,b[5])\right\}$$

Out[159]=

$$\left\{b[4] \to \frac{1}{360}\,(1-2880\,b[5])\right\}$$

Out[162]=

$$\left\{b[5] \to -\frac{1}{2520}\right\}$$