

(\* Data resulting from a previous run of ssf-082.nb \*)

```
Lx = {{ {1., 0.02115956561488493` - 0.0009171541215802683` i},
  {1.5848931924611136`, 0.021027264078412412` - 0.0012995024087022083` i},
  {2.51188643150958`, 0.02078434153530661` - 0.0018294074338103933` i},
  {3.9810717055349722`, 0.020355354156557162` - 0.0025328939877093844` i},
  {6.309573444801933`, 0.019620249733777014` - 0.0033950349444007537` i},
  {10., 0.01845173450605709` - 0.004288014216135693` i},
  {15.848931924611133`, 0.016861265939313756` - 0.00496275569572349` i},
  {25.118864315095795`, 0.015089373719317034` - 0.005257472933430522` i},
  {39.810717055349734`, 0.013369608427370418` - 0.005262101973974475` i},
  {63.09573444801933`, 0.011748382570821404` - 0.005105929192935883` i},
  {100., 0.010235349669146835` - 0.004829735833117404` i},
  {158.48931924611142`, 0.008856731387079314` - 0.004468408487381067` i},
  {251.18864315095797`, 0.007624963808112143` - 0.004055174468870383` i},
  {398.1071705534973`, 0.006546694162029133` - 0.0036194857824142367` i},
  {630.957344480193`, 0.005617050617861361` - 0.003188224163899863` i},
  {1000., 0.004823292180065514` - 0.002779617718437016` i},
  {1584.893192461114`, 0.004149753045248547` - 0.002404500607890674` i},
  {2511.88643150958`, 0.003580026487420788` - 0.0020676513486156513` i},
  {3981.0717055349733`, 0.0030990950277849294` - 0.001769470945757984` i},
  {6309.57344480193`, 0.0026941601981507876` - 0.001508145895524106` i},
  {10000., 0.0023543231479630443` - 0.0012812888305375359` i}},
  {{ {1., 0.018321470561671462` - 0.0007396726974445514` i},
  {1.5848931924611136`, 0.01821197733492537` - 0.0010466448133254758` i},
  {2.51188643150958`, 0.018012564522825687` - 0.0014688145100378003` i},
  {3.9810717055349722`, 0.017664879726055367` - 0.0020245083912960086` i},
  {6.309573444801933`, 0.01707748723439439` - 0.0027004414849726693` i},
  {10., 0.016155039569023935` - 0.0033972769839182714` i},
  {15.848931924611133`, 0.014909902542072782` - 0.0039253563308229026` i},
  {25.118864315095795`, 0.013527602585239835` - 0.004165783179296833` i},
  {39.810717055349734`, 0.012182776211792952` - 0.004191713109390209` i},
  {63.09573444801933`, 0.010905707133693817` - 0.0041012606310578395` i},
  {100., 0.009701755970202381` - 0.003922894455112533` i},
  {158.48931924611142`, 0.008590530357623099` - 0.003681573889892812` i},
  {251.18864315095797`, 0.007581371115166791` - 0.0034017003371546906` i},
  {398.1071705534973`, 0.006678901335982281` - 0.0031050993773796163` i},
  {630.957344480193`, 0.005878754662809474` - 0.002811088215670024` i},
  {1000., 0.005171087735137035` - 0.002531682993373221` i},
  {1584.893192461114`, 0.004544690784554736` - 0.00227297097040328` i},
  {2511.88643150958`, 0.00398863694477779` - 0.0020363327139858944` i},
  {3981.0717055349733`, 0.0034941353406057023` - 0.0018199930839537491` i},
  {6309.57344480193`, 0.003054982520893062` - 0.0016212931430000437` i},
```

```
{10000.` , 0.002666741478449812` - 0.0014382161322731286` i}},  
{1.` , 0.014683294265233616` - 0.0005285452501528506` i},  
{1.5848931924611136` , 0.014602921808954825` - 0.0007468963663572725` i},  
{2.51188643150958` , 0.014457916407779861` - 0.0010446234645223576` i},  
{3.9810717055349722` , 0.014208739651389536` - 0.001432974047567586` i},  
{6.309573444801933` , 0.013794313716810646` - 0.0019020937328729686` i},  
{10.` , 0.013151621007415541` - 0.002384742509912995` i},  
{15.848931924611133` , 0.01229051632760703` - 0.002754311679225683` i},  
{25.118864315095795` , 0.01133589278321282` - 0.0029335325840017593` i},  
{39.810717055349734` , 0.010402722336615065` - 0.00297358289756914` i},  
{63.09573444801933` , 0.009508804386909764` - 0.002940102932854972` i},  
{100.` , 0.008656484869473876` - 0.0028515378694003485` i},  
{158.48931924611142` , 0.007857841995824932` - 0.0027243491501252404` i},  
{251.18864315095797` , 0.007118039357818878` - 0.0025745842057108078` i},  
{398.1071705534973` , 0.006438909529706102` - 0.002416492691654683` i},  
{630.957344480193` , 0.005816080310656056` - 0.0022621175345912143` i},  
{1000.` , 0.005241754387683517` - 0.002117823505828476` i},  
{1584.893192461114` , 0.004707875825962733` - 0.001985296801968442` i},  
{2511.88643150958` , 0.0042075069957876335` - 0.0018624869601899195` i},  
{3981.0717055349733` , 0.0037364574883063063` - 0.00174490318881218` i},  
{6309.57344480193` , 0.0032937441423385857` - 0.001627739594794722` i},  
{10000.` , 0.0028808046864765464` - 0.0015074921112195883` i}},  
{1.` , 0.010934210774473022` - 0.0003298791139943653` i},  
{1.5848931924611136` , 0.010882560595820623` - 0.00046545066593167825` i},  
{2.51188643150958` , 0.010790453410343848` - 0.0006484600858877773` i},  
{3.9810717055349722` , 0.010634893691669256` - 0.0008847994169106159` i},  
{6.309573444801933` , 0.01038074410996424` - 0.001168476793483391` i},  
{10.` , 0.009991806358344449` - 0.001460533455344427` i},  
{15.848931924611133` , 0.009474285662890047` - 0.001688019101568376` i},  
{25.118864315095795` , 0.008900624792220778` - 0.0018074549911205296` i},  
{39.810717055349734` , 0.008336317249351875` - 0.0018496824986311325` i},  
{63.09573444801933` , 0.007790490224340479` - 0.0018532049250903897` i},  
{100.` , 0.007263226144135357` - 0.0018293922368968648` i},  
{158.48931924611142` , 0.006759673522635791` - 0.001788004169169733` i},  
{251.18864315095797` , 0.0062811749403368705` - 0.001738012567802049` i},  
{398.1071705534973` , 0.005827288414614025` - 0.0016870886437124132` i},  
{630.957344480193` , 0.005394284727704235` - 0.001641468643829391` i},  
{1000.` , 0.004976226659070606` - 0.001604106705535441` i},  
{1584.893192461114` , 0.004566764547010775` - 0.0015742329785994637` i},  
{2511.88643150958` , 0.00416103555828927` - 0.001547705694646882` i},  
{3981.0717055349733` , 0.003757070645535504` - 0.001518280580680371` i},  
{6309.57344480193` , 0.003356376891459229` - 0.0014792270537758024` i},  
{10000.` , 0.00296366969253435` - 0.001424935151096118` i}},
```

```

{{1., 0.007911592854629208` - 0.00017778042560951348` i},
 {1.5848931924611136`, 0.007882907272775611` - 0.00025030472160686266` i},
 {2.51188643150958`, 0.007832466116656637` - 0.00034698663202678147` i},
 {3.9810717055349722`, 0.007749097414858547` - 0.0004703236658767773` i},
 {6.309573444801933`, 0.007615959930805279` - 0.000617396977584823` i},
 {10., 0.007415611993393265` - 0.0007696257382076758` i},
 {15.848931924611133`, 0.007150991920357829` - 0.0008921954493218429` i},
 {25.118864315095795`, 0.006856781437239547` - 0.000964761160150495` i},
 {39.810717055349734`, 0.006563927443084989` - 0.001002825707021102` i},
 {63.09573444801933`, 0.006276086783300407` - 0.0010254556560940567` i},
 {100., 0.005992418720732797` - 0.0010387531228077504` i},
 {158.48931924611142`, 0.0057141883552795925` - 0.0010479994803612015` i},
 {251.18864315095797`, 0.005440617753499459` - 0.001057947828976275` i},
 {398.1071705534973`, 0.005169785774865106` - 0.0010725691877891766` i},
 {630.957344480193`, 0.0048978717407986054` - 0.00109474470907004` i},
 {1000., 0.004619821203508072` - 0.0011251033508852533` i},
 {1584.893192461114`, 0.004330500522162574` - 0.0011615666470673695` i},
 {2511.88643150958`, 0.004026042009064476` - 0.0011993671483101606` i},
 {3981.0717055349733`, 0.0037051048099267458` - 0.0012316846843737584` i},
 {6309.57344480193`, 0.0033697689871492733` - 0.0012508457685772496` i},
 {10000., 0.00302568815848491` - 0.0012498515116032636` i}},
{{1., 0.005634683978182211` - 0.00008144165379390829` i},
 {1.5848931924611136`, 0.005621076809599855` - 0.00011435491935007634` i},
 {2.51188643150958`, 0.005597587596970837` - 0.0001575315201681861` i},
 {3.9810717055349722`, 0.005559847259674825` - 0.00021178908316069452` i},
 {6.309573444801933`, 0.0055013478784520144` - 0.000276098591508513` i},
 {10., 0.005415190252565398` - 0.00034347960691828526` i},
 {15.848931924611133`, 0.005302324154673748` - 0.00040063211041644367` i},
 {25.118864315095795`, 0.005176030926966801` - 0.00043999904613449857` i},
 {39.810717055349734`, 0.00504795664818438` - 0.0004681006950829791` i},
 {63.09573444801933`, 0.0049189540631106145` - 0.0004928424511753538` i},
 {100., 0.004787980351004044` - 0.0005171245711116938` i},
 {158.48931924611142`, 0.004654591485871396` - 0.0005435257440927464` i},
 {251.18864315095797`, 0.004517334903288322` - 0.0005743555998254884` i},
 {398.1071705534973`, 0.004374063894141682` - 0.0006114941735178056` i},
 {630.957344480193`, 0.004221631284680055` - 0.0006561395631395511` i},
 {1000., 0.004056172124690186` - 0.00070814670474638` i},
 {1584.893192461114`, 0.0038737575013188677` - 0.0007655556083624105` i},
 {2511.88643150958`, 0.0036713350224625795` - 0.0008244567247452338` i},
 {3981.0717055349733`, 0.003447639284911691` - 0.0008792924757169542` i},
 {6309.57344480193`, 0.003203998322724664` - 0.0009235033444330788` i},
 {10000., 0.0029448433157149784` - 0.0009506712308024728` i}},
{{1., 0.0040691924897304395` - 0.00003267971283688771` i},

```

```

{1.5848931924611136`, 0.004063478566591004` - 0.00004580834916698966` i},
{2.51188643150958`, 0.004053847629547628` - 0.00006271153398016587` i},
{3.9810717055349722`, 0.004038896614643505` - 0.00008361930671633461` i},
{6.309573444801933`, 0.00401651114136595` - 0.00010833329489068486` i},
{10.` , 0.003984292700589832` - 0.0001347588865060986` i},
{15.848931924611133`, 0.0039423578994915035` - 0.0001586447775292671` i},
{25.118864315095795`, 0.003894935490389595` - 0.0001776379236549797` i},
{39.810717055349734`, 0.0038456847643545634` - 0.00019413610437689932` i},
{63.09573444801933`, 0.0037945939980818383` - 0.00021105439823874647` i},
{100.` , 0.0037409191537392797` - 0.00022968390573456445` i},
{158.48931924611142`, 0.003683987559021243` - 0.00025122433570906263` i},
{251.18864315095797`, 0.003622653929465936` - 0.0002767693260561506` i},
{398.1071705534973`, 0.0035553872390359648` - 0.0003072152430062746` i},
{630.957344480193`, 0.0034801605449121375` - 0.0003431038184943207` i},
{1000.` , 0.0033945750117036137` - 0.00038430350371654754` i},
{1584.893192461114`, 0.0032961477997980383` - 0.0004297501195699367` i},
{2511.88643150958`, 0.0031827415009543706` - 0.00047727702637493784` i},
{3981.0717055349733`, 0.003053116415919978` - 0.0005236087858610911` i},
{6309.57344480193`, 0.0029075485574321072` - 0.0005646604393872117` i},
{10000.` , 0.0027482375960115294` - 0.0005962295335628446` i}}};

Vx = {{{1.` , 5.771787000189593` + 0.13294947177775696` i},
{1.5848931924611136`, 5.778965026613373` + 0.20939323056218645` i},
{2.51188643150958`, 5.794897244040607` + 0.3280319446958828` i},
{3.9810717055349722`, 5.829381682229753` + 0.5091649867388831` i},
{6.309573444801933`, 5.900617858261826` + 0.7778294804776315` i},
{10.` , 6.035448224912423` + 1.1593566714043773` i},
{15.848931924611133`, 6.260224364855577` + 1.6790748112714857` i},
{25.118864315095795`, 6.595792760525233` + 2.3815027274173293` i},
{39.810717055349734`, 7.082276523506411` + 3.344248616491562` i},
{63.09573444801933`, 7.790229902430324` + 4.65755453447827` i},
{100.` , 8.800636350730503` + 6.4310598655029025` i},
{158.48931924611142`, 10.215743577901776` + 8.819690428800461` i},
{251.18864315095797`, 12.166160142909435` + 12.034211918438263` i},
{398.1071705534973`, 14.819729485100233` + 16.375777206113234` i},
{630.957344480193`, 18.405469294244906` + 22.268358574387495` i},
{1000.` , 23.230825297047783` + 30.305638558017012` i},
{1584.893192461114`, 29.710337220574807` + 41.323977905003446` i},
{2511.88643150958`, 38.398707893204275` + 56.5022975939141` i},
{3981.0717055349733`, 50.026408558047606` + 77.52017805686702` i},
{6309.57344480193`, 65.55321187606965` + 106.80787730757578` i},
{10000.` , 86.26656057278785` + 147.92648563677957` i}},
{{1.` , 5.770671851513163` + 0.11511719463902687` i},

```

```

{1.5848931924611136`, 5.776447025765958` + 0.18135810511840816` i},
{2.51188643150958`, 5.789206132882342` + 0.28428596399579925` i},
{3.9810717055349722`, 5.816665020880349` + 0.44186596716930854` i},
{6.309573444801933`, 5.873081242927113` + 0.6770236466727766` i},
{10.` , 5.9794815540121595` + 1.0150510725699706` i},
{15.848931924611133`, 6.156918293466701` + 1.4847545781563056` i},
{25.118864315095795`, 6.423495210254156` + 2.135013888013412` i},
{39.810717055349734`, 6.814531473309905` + 3.0473766462678773` i},
{63.09573444801933`, 7.391936895898144` + 4.3234824373510605` i},
{100.` , 8.230851108508244` + 6.095793056581768` i},
{158.48931924611142`, 9.432199709941617` + 8.554602715396722` i},
{251.18864315095797`, 11.134804928355175` + 11.96541110597518` i},
{398.1071705534973`, 13.533053040741995` + 16.706477735590195` i},
{630.957344480193`, 16.91034327565985` + 23.3058638257628` i},
{1000.` , 21.673005475387313` + 32.49090247954479` i},
{1584.893192461114`, 28.40054172813899` + 45.2568380619823` i},
{2511.88643150958`, 37.90441690951497` + 62.95125257871357` i},
{3981.0717055349733`, 51.290159786673726` + 87.40164187673938` i},
{6309.57344480193`, 70.03884615269017` + 121.11239654925492` i},
{10000.` , 96.12659373839219` + 167.55630827486019` i}},
{{1.` , 5.769345298638407` + 0.0922578587883198` i},
{1.5848931924611136`, 5.773462077489648` + 0.14541848914919367` i},
{2.51188643150958`, 5.782511274960261` + 0.2281842043173748` i},
{3.9810717055349722`, 5.801868492460198` + 0.3554147316982672` i},
{6.309573444801933`, 5.841431369674628` + 0.5468647961916937` i},
{10.` , 5.915862136711341` + 0.8263407187938866` i},
{15.848931924611133`, 6.040303587047384` + 1.2239114463576113` i},
{25.118864315095795`, 6.229013437309542` + 1.7891040465365087` i},
{39.810717055349734`, 6.5098306813817555` + 2.602117329835153` i},
{63.09573444801933`, 6.931604993195137` + 3.7696912509227065` i},
{100.` , 7.55769791269856` + 5.439029854370062` i},
{158.48931924611142`, 8.478978311824566` + 7.824978630683958` i},
{251.18864315095797`, 9.82939665922147` + 11.234150906348361` i},
{398.1071705534973`, 11.810585274724245` + 16.106166761287188` i},
{630.957344480193`, 14.733991876187607` + 23.05739625049624` i},
{1000.` , 19.072649624009287` + 32.93491415253224` i},
{1584.893192461114`, 25.53583126208674` + 46.881863689302556` i},
{2511.88643150958`, 35.160670585007026` + 66.405601533983` i},
{3981.0717055349733`, 49.41187532304193` + 93.46304234030116` i},
{6309.57344480193`, 70.29441070046165` + 130.57791459754296` i},
{10000.` , 100.47933186896073` + 181.0062963096732` i}},
{{1.` , 5.76809704249066` + 0.06870167248378298` i},
{1.5848931924611136`, 5.770659391214346` + 0.10837047137705215` i},

```

```

{2.51188643150958`, 5.776258767836567` + 0.17030192707007819` i},
{3.9810717055349722`, 5.788156555718534` + 0.2660192234358066` i},
{6.309573444801933`, 5.8123476989478124` + 0.4115364945698896` i},
{10.` , 5.857792369187057` + 0.6278037090293439` i},
{15.848931924611133`, 5.9341202782119655` + 0.9434661945671567` i},
{25.118864315095795`, 6.051288575521732` + 1.4047542736155072` i},
{39.810717055349734`, 6.228700356986609` + 2.085230661707798` i},
{63.09573444801933`, 6.500712764919227` + 3.0884790184057316` i},
{100.` , 6.915464870704191` + 4.5636195791554` i},
{158.48931924611142`, 7.546549348399485` + 6.7314029593785385` i},
{251.18864315095797`, 8.509065097144012` + 9.913357260578609` i},
{398.1071705534973`, 9.986067756918358` + 14.57626924852509` i},
{630.957344480193`, 12.273477811327282` + 21.385220597245528` i},
{1000.` , 15.844871772356766` + 31.266554229462884` i},
{1584.893192461114`, 21.442384695690365` + 45.47665250926826` i},
{2511.88643150958`, 30.192588699203277` + 65.67215919762056` i},
{3981.0717055349733`, 43.74318017891963` + 93.97865596443785` i},
{6309.57344480193`, 64.40674697586114` + 133.0609410304596` i},
{10000.` , 95.29212508042865` + 186.21285819508955` i}},
{{1.` , 5.767141378246561` + 0.04971000398060248` i},
{1.5848931924611136`, 5.768516929686451` + 0.07849939078678449` i},
{2.51188643150958`, 5.771500718457123` + 0.12361705506267408` i},
{3.9810717055349722`, 5.77788937515683` + 0.1938344600702374` i},
{6.309573444801933`, 5.790500569950063` + 0.30192878463305517` i},
{10.` , 5.814381357017769` + 0.46593664320634387` i},
{15.848931924611133`, 5.854870745376733` + 0.7121084770440061` i},
{25.118864315095795`, 5.918289175138154` + 1.0821816728673141` i},
{39.810717055349734`, 6.016869197600467` + 1.6418884210063218` i},
{63.09573444801933`, 6.172558030598581` + 2.4881055992285486` i},
{100.` , 6.418691664211566` + 3.765147726057636` i},
{158.48931924611142`, 6.809639535296959` + 5.690290259784197` i},
{251.18864315095797`, 7.4357428635906055` + 8.58673544695032` i},
{398.1071705534973`, 8.448920389108249` + 12.931604556013742` i},
{630.957344480193`, 10.106033462204264` + 19.41723007242349` i},
{1000.` , 12.835204932328981` + 29.027192707673844` i},
{1584.893192461114`, 17.33298006836767` + 43.12389338453802` i},
{2511.88643150958`, 24.694884065488154` + 63.541603538766715` i},
{3981.0717055349733`, 36.574324524528144` + 92.67879236122563` i},
{6309.57344480193`, 55.35274925273353` + 133.59186020704698` i},
{10000.` , 84.29129556853853` + 190.10959333543386` i}},
{{1.` , 5.76653606389098` + 0.03540376358232418` i},
{1.5848931924611136`, 5.767163117408136` + 0.055975681287429135` i},
{2.51188643150958`, 5.768510615130059` + 0.08834475424302887` i},

```

```

{3.9810717055349722`, 5.771322002262798` + 0.13907296991590562` i},
{6.309573444801933`, 5.776970061932497` + 0.2180966409849465` i},
{10.` , 5.78760580590947` + 0.34024643830502166` i},
{15.848931924611133`, 5.805919994972176` + 0.5280148573275717` i},
{25.118864315095795`, 5.83546781826671` + 0.8169147374213153` i},
{39.810717055349734`, 5.883114092423537` + 1.2626863478095418` i},
{63.09573444801933`, 5.96140768434981` + 1.9500809293044403` i},
{100.` , 6.090942779029368` + 3.0083767792493257` i},
{158.48931924611142`, 6.3072756282421425` + 4.6351248766339355` i},
{251.18864315095797`, 6.672506274648517` + 7.129550631426415` i},
{398.1071705534973`, 7.295596051336946` + 10.941200863057754` i},
{630.957344480193`, 8.367217609077688` + 16.736327587501773` i},
{1000.` , 10.215389059578332` + 25.485681097239937` i},
{1584.893192461114`, 13.389431805336052` + 38.57556525613461` i},
{2511.88643150958`, 18.777804848913046` + 57.943388054548095` i},
{3981.0717055349733`, 27.759652332257318` + 86.23859831587737` i},
{6309.57344480193`, 42.3755144486306` + 127.02001165580964` i},
{10000.` , 65.49324412328453` + 185.02996205290154` i}},
{{1.` , 5.76622968358001` + 0.02556749046357065` i},
{1.5848931924611136`, 5.766480518486997` + 0.040464841322448326` i},
{2.51188643150958`, 5.767014104672304` + 0.06398044985751969` i},
{3.9810717055349722`, 5.768115987667243` + 0.10102819756502142` i},
{6.309573444801933`, 5.770319137745436` + 0.15923144795870764` i},
{10.` , 5.774491496271487` + 0.25034049355850224` i},
{15.848931924611133`, 5.781822466544589` + 0.39258700206010116` i},
{25.118864315095795`, 5.79406028602742` + 0.6147239551501622` i},
{39.810717055349734`, 5.814585106820587` + 0.961952328112051` i},
{63.09573444801933`, 5.849695011068618` + 1.504337160943708` i},
{100.` , 5.910338482491018` + 2.3504888262121315` i},
{158.48931924611142`, 6.016196693906697` + 3.668580246378487` i},
{251.18864315095797`, 6.2028363361828935` + 5.717507150391296` i},
{398.1071705534973`, 6.534478477910116` + 8.893378530739998` i},
{630.957344480193`, 7.126211842422402` + 13.796824736474305` i},
{1000.` , 8.180622217037694` + 21.32874383765024` i},
{1584.893192461114`, 10.045421102062` + 32.82362525316973` i},
{2511.88643150958`, 13.298389904644546` + 50.23208852870588` i},
{3981.0717055349733`, 18.862647650550056` + 76.37007773827547` i},
{6309.57344480193`, 28.149467675922644` + 115.26749218974616` i},
{10000.` , 43.223015479806186` + 172.67686035941892` i}}};

B1 = {{-15, 6.962330866723141`}, {-10, 11.654762138275178`},
{-5, 15.137202588031142`}, {0, 15.982730534865045`},
{5, 15.168663478584627`}, {10, 11.883829759386494`}, {15, 7.44852069172337`}};

Xx = {-15, -10, -5, 0, 5, 10, 15};

Lo =
{0.021287820932915`, 0.01842757969762466`, 0.014761178593457469`, 0.010984303111449108`,
0.00793938809760252`, 0.005647879829340658`, 0.00407478597213213`};

myPrecision = 32;
n = 8; (* Number of time constants in the eddy current model *)

(* Function to regress network model inductances and resistances *)

```

```

GetModel[Ll_, Lo_, n_] :=
Module[{Ff, k, p, s, f, ics, cost, ans, T, eqs, L, R, vars, Lfd, ans2},
  Off[FindMinimum::"lstol"];
  Lfd = SetPrecision[Ll, myPrecision];
  Ff = 0;
  For[k = n, k >= 1, k--,
    Ff = (s / 10^p[k]) / (1 + Ff);
  ];
  L[0] = SetPrecision[Lo, myPrecision];
  Ff = L[0] / (1 + Ff);
  f = SetPrecision[Table[(4 * k / n), {k, 1, n}], myPrecision];
  ics = Table[{p[k], f[[k]]}, {k, 1, n}];
  cost = Total[Table[Abs[(Ff /. s → I Lfd[[k, 1]]) - Lfd[[k, 2]]]^2, {k, 1, Length[Lfd]}] /
    Total[Abs[Lfd.{0, 1}]^2];
  ans = FindMinimum[cost, ics, MaxIterations → 1000, WorkingPrecision → myPrecision][[2]];
  T = Table[1 / (2. Pi * 10^p[k]), {k, 1, n}] /. ans;
  For[k = 1, k ≤ (n / 2), k++,
    R[k] = L[k - 1] / T[[2 * k - 1]];
    L[k] = R[k] * T[[2 * k]];
  ];
  N[Join[Table[L[k], {k, 0, n / 2}], Table[R[k], {k, 1, n / 2}]]]
]

parms = Table[GetModel[Lx[[k]], Lo[[k]], n], {k, 1, Length[Lx]}]

{{0.0212878, 0.0296903, 0.0164544,
  0.00748565, 0.00333699, 4.27888, 10.2757, 35.4912, 175.214},
{0.0184276, 0.0291711, 0.0171108, 0.00834418, 0.00319475, 4.06666, 11.9118, 48.5226, 239.5},
{0.0147612, 0.0280896, 0.0178033, 0.00893886, 0.00275244, 3.75309, 13.7766, 66.2814, 299.8},
{0.0109843, 0.0270665, 0.0186509, 0.00912472,
  0.00228475, 3.44875, 16.2764, 88.8108, 351.087},
{0.00793939, 0.0288263, 0.0208961, 0.00920227, 0.00190321, 3.53058, 21.975, 124.76, 420.653},
{0.00564788, 0.0345292, 0.0237551, 0.00927017,
  0.00160428, 4.22264, 33.0987, 171.443, 530.951},
{0.00407479, 0.046594, 0.0278375, 0.0107192, 0.00145884, 6.00796, 53.0412, 243.636, 777.25}}

Ls = Table[Transpose[{Xx, Transpose[parms][[k]]}], {k, 1, n / 2 + 1}]

{{{-15, 0.0212878}, {-10, 0.0184276}, {-5, 0.0147612},
  {0, 0.0109843}, {5, 0.00793939}, {10, 0.00564788}, {15, 0.00407479}},
{{{-15, 0.0296903}, {-10, 0.0291711}, {-5, 0.0280896}, {0, 0.0270665}, {5, 0.0288263},
  {10, 0.0345292}, {15, 0.046594}}, {{-15, 0.0164544}, {-10, 0.0171108},
  {-5, 0.0178033}, {0, 0.0186509}, {5, 0.0208961}, {10, 0.0237551}, {15, 0.0278375}},
{{{-15, 0.00748565}, {-10, 0.00834418}, {-5, 0.00893886}, {0, 0.00912472},
  {5, 0.00920227}, {10, 0.00927017}, {15, 0.0107192}},
{{{-15, 0.00333699}, {-10, 0.00319475}, {-5, 0.00275244}, {0, 0.00228475},
  {5, 0.00190321}, {10, 0.00160428}, {15, 0.00145884}}}

Rs = Table[Transpose[{Xx, Transpose[parms][[k]]}], {k, n / 2 + 2, n + 1}]

{{{-15, 4.27888}, {-10, 4.06666}, {-5, 3.75309}, {0, 3.44875},
  {5, 3.53058}, {10, 4.22264}, {15, 6.00796}}, {{-15, 10.2757}, {-10, 11.9118},
  {-5, 13.7766}, {0, 16.2764}, {5, 21.975}, {10, 33.0987}, {15, 53.0412}},
{{{-15, 35.4912}, {-10, 48.5226}, {-5, 66.2814}, {0, 88.8108}, {5, 124.76},
  {10, 171.443}, {15, 243.636}}, {{-15, 175.214}, {-10, 239.5},
  {-5, 299.8}, {0, 351.087}, {5, 420.653}, {10, 530.951}, {15, 777.25}}}

```



```

LsFit = Table[Fit[Ls[[k]], {1, d, d^2, d^3}, d], {k, 1, Length[Ls]}]

```

```

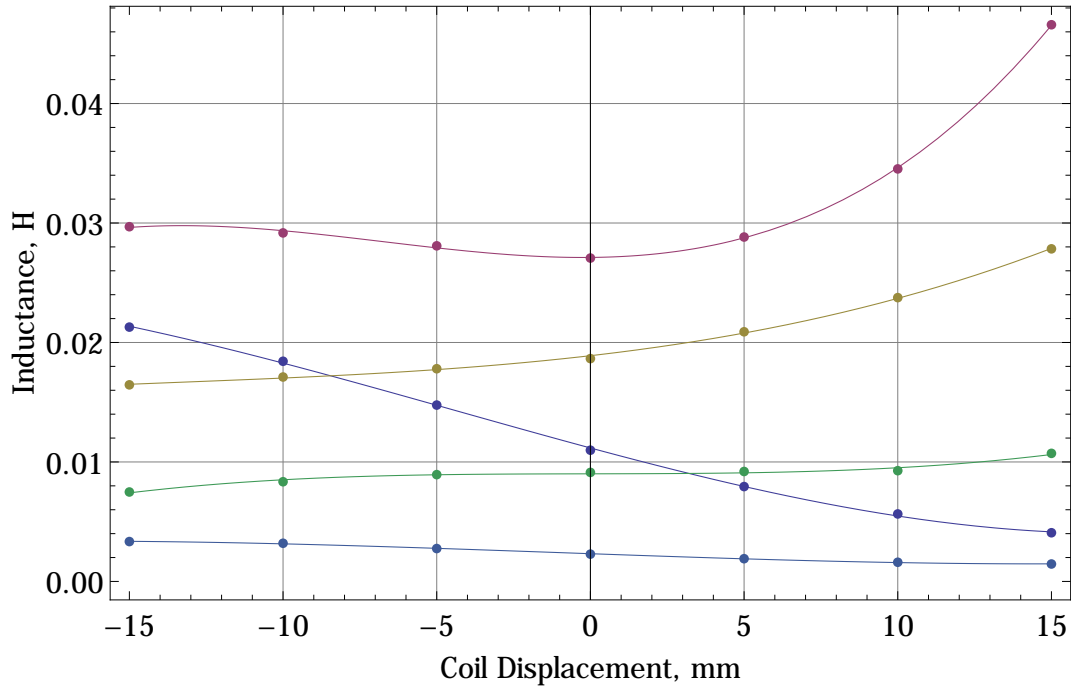
{0.0111712 - 0.000693029 d + 7.0353 × 10-6 d2 + 5.30768 × 10-7 d3,
 0.0271188 + 0.0000236835 d + 0.0000487656 d2 + 2.40197 × 10-6 d3,
 0.0188936 + 0.000296923 d + 0.0000146467 d2 + 3.65765 × 10-7 d3,
 0.00900729 + 4.90623 × 10-6 d + 4.84707 × 10-8 d2 + 4.54247 × 10-7 d3,
 0.0023206 - 0.000090871 d + 4.15803 × 10-7 d2 + 1.24788 × 10-7 d3}

```

```

Show[ListPlot[Ls, PlotStyle → PointSize[0.01]], Plot[LsFit, {d, -15, 15}],
 ImageSize → 500, Frame → True, BaseStyle → {FontSize → 14, FontFamily → "Tahoma"},
 FrameLabel → {"Coil Displacement, mm", "Inductance, H"}, GridLines → Automatic]

```



```

RsFit = Table[Fit[Rs[[k]], {1, d, d^2, d^3}, d], {k, 1, Length[Rs]}]

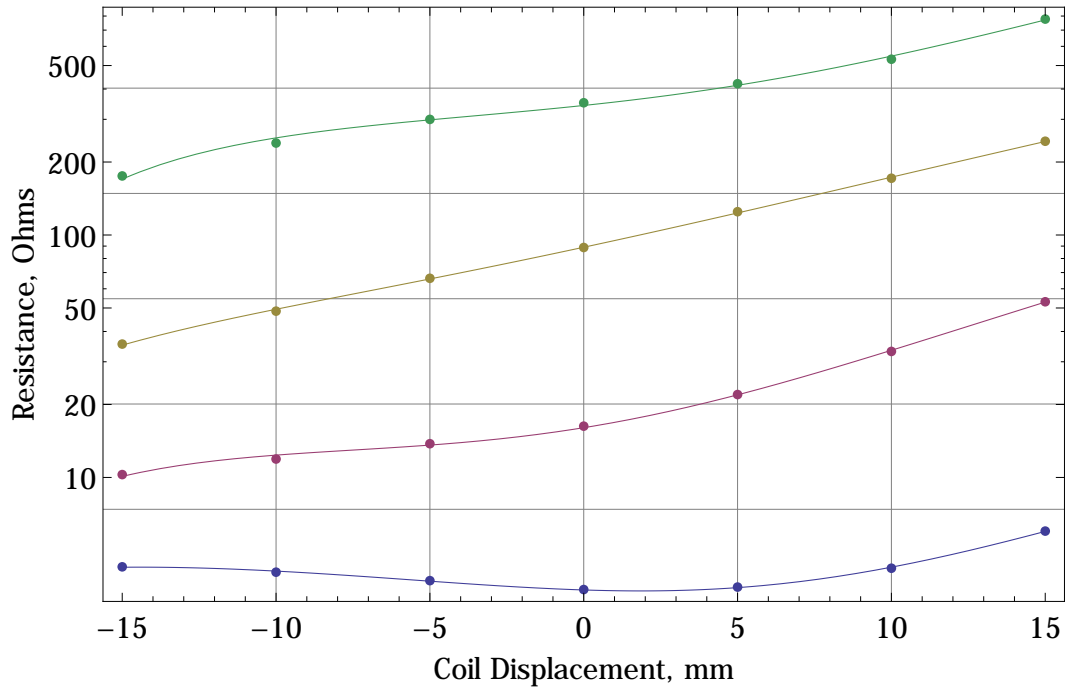
```

```

{3.43512 - 0.0321385 d + 0.00751819 d2 + 0.000399023 d3,
 16.0401 + 0.757299 d + 0.0686781 d2 + 0.00297334 d3,
 89.0271 + 5.59388 d + 0.222509 d2 + 0.00594338 d3, 342.226 + 10.5492 d + 0.569818 d2 + 0.0421624 d3}

```

```
Show[ListLogPlot[Rs, PlotStyle -> PointSize[0.01]], LogPlot[RsFit, {d, -15, 15}],
ImageSize -> 500, Frame -> True, BaseStyle -> {FontSize -> 14, FontFamily -> "Tahoma"},
FrameLabel -> {"Coil Displacement, mm", "Resistance, Ohms"}, GridLines -> Automatic]
```

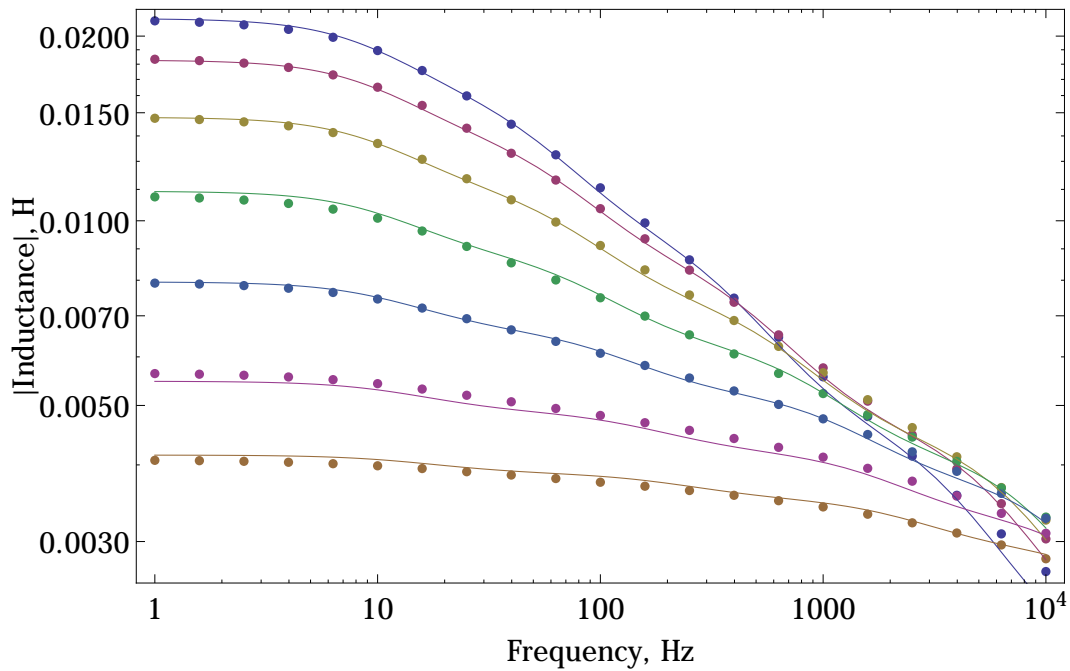


```
Lfit = 0;
For[k = n - 1, k ≥ 0, k--,
  T = L[Ceiling[k / 2]] / R[Floor[k / 2 + 1]];
  Lfit = (s T) / (1 + Lfit);
];
Lfit = L[0] / (1 + Lfit);

Lfit = Lfit /. Table[L[k - 1] -> LsFit[[k]], {k, 1, Length[LsFit]}] /.
  Table[R[k] -> RsFit[[k]], {k, 1, Length[RsFit]}];

Zz = Table[Abs[Lfit /. d -> Xx[[k]] /. s -> 2. Pi I w], {k, 1, Length[Xx]}];
```

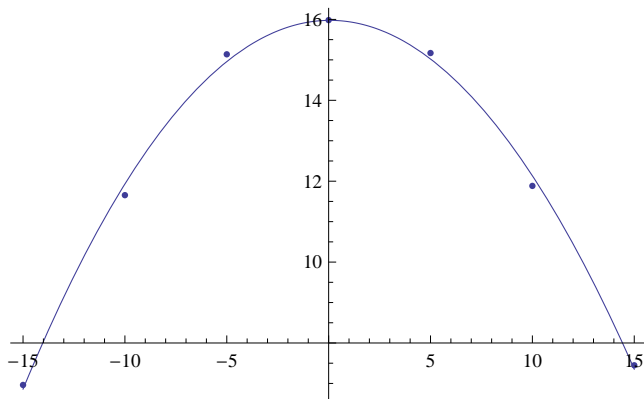
```
Show[ListLogLogPlot[Abs[Lx], PlotStyle -> PointSize[0.01]], LogLogPlot[Zz, {w, 1, 10 000}],
ImageSize -> 500, Frame -> True, BaseStyle -> {FontSize -> 14, FontFamily -> "Tahoma"},
FrameLabel -> {"Frequency, Hz", "|Inductance|, H"}]
```



```
B1Fit = Fit[B1, {1, d, d^2, d^3}, d]
```

```
15.9766 + 0.00513975 d - 0.0394258 d^2 + 0.000050147 d^3
```

```
Show[ListPlot[B1, PlotStyle -> PointSize[0.01]], Plot[B1Fit, {d, -15, 15}], PlotRange -> All]
```



```
(* Table of polynomial coefficients needed to
interpolate inductances across a wide range of positions *)
```

```
MatrixForm[Table[Table[Coefficient[d * LsFit[[j]], d^k], {k, 1, 4}], {j, 1, Length[LsFit]}]]
```

$$\begin{pmatrix} 0.0111712 & -0.000693029 & 7.0353 \times 10^{-6} & 5.30768 \times 10^{-7} \\ 0.0271188 & 0.0000236835 & 0.0000487656 & 2.40197 \times 10^{-6} \\ 0.0188936 & 0.000296923 & 0.0000146467 & 3.65765 \times 10^{-7} \\ 0.00900729 & 4.90623 \times 10^{-6} & 4.84707 \times 10^{-8} & 4.54247 \times 10^{-7} \\ 0.0023206 & -0.000090871 & 4.15803 \times 10^{-7} & 1.24788 \times 10^{-7} \end{pmatrix}$$

(\* Table of polynomial coefficients needed to interpolate resistances across a wide range of positions \*)

```
MatrixForm[Table[Table[Coefficient[d * RsFit[[j]], d^k], {k, 1, 4}], {j, 1, Length[RsFit]}]]
```

$$\begin{pmatrix} 3.43512 & -0.0321385 & 0.00751819 & 0.000399023 \\ 16.0401 & 0.757299 & 0.0686781 & 0.00297334 \\ 89.0271 & 5.59388 & 0.222509 & 0.00594338 \\ 342.226 & 10.5492 & 0.569818 & 0.0421624 \end{pmatrix}$$

(\* List of polynomial coefficients needed to interpolate B1 curve across a wide range of positions \*)

```
Table[Coefficient[d * B1Fit, d^k], {k, 1, 4}]
```

```
{15.9766, 0.00513975, -0.0394258, 0.000050147}
```